TNRCC

*Protecting Texas by Reducing and Preventing Pollution*

2002-0001-0073

# Hazard Ranking System Documentation Record

## Falcon Refinery

aka National Oil Recovery Corporation

**Ingleside, San Patricio County, Texas**

**TXD 086 278 058**

**REGION VI**

**Prepared in cooperation with the U.S. Environmental Protection Agency**

**February 2002**

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**Texas Natural Resource Conservation Commission**
**Site Assessment and Management Section**
**Superfund Site Discovery and Assessment Program**
**Austin, Texas**

**February 2002**

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**Falcon Refinery**
**aka National Oil Recovery Corporation**
**Ingleside, San Patricio County, Texas**
**TXD 086 278 058**

## Site History

The Falcon Refinery a.k.a. National Oil Recovery Corporation (NORCO) site (the "site") consists of a refinery that has operated intermittently since 1980 and is currently inactive. When in operation, the refinery operated at a 40,000 barrels per day capacity with primary products consisting of naphtha, jet fuel, kerosene, diesel, and fuel oil (Ref. 38, p. 18).

The site occupies approximately 104 acres in San Patricio County, Texas, and is located 1.7 miles southeast of State Highway 361 on FM 2725 at the northwest and southeast corners of FM 2725 and Bishop Road. Another portion of the site includes a dock facility on Redfish Bay where materials were transferred between barges and storage tanks. The site is bordered by wetlands to the northeast and southeast, residential areas to the north and southwest, an abandoned refinery to the northwest, and a construction company to the southwest (Ref. 4, p. 1; Ref. 38, p. 18).

The site (either whole or in part) has been owned, leased and/or operated under several different companies (Ref. 5, pp. 1-166). The Oil and Gas Company of Texas, Inc., originally owned the site (Ref. 79, p. 1). A deed search revealed that the facility was leased to UNI Refining, Inc., from the UNI International Corporation and the UNI Pipeline, Inc., for seven years, 1979-1986. UNI Refining Co. obtained an air permit in 1979 and commenced construction of the facility in April 1980 (Ref. 5, pp. 137-166). In March 1981, UNI Oil, Inc., the parent corporation of UNI Refining Company and UNI Pipeline Company, was sold to new owners operating under the name of Texas Independent Oil Corporation (Ref. 80, p. 1). In late 1983 to early 1984, the refinery was sold and operated under the name MidGulf Energy, Inc. (Ref. 81, p. 1).

The Falcon Refining Company (FRC) purchased the site from Texas Independent Refining facility in November 1985 (Ref. 52, p. 1). In 1986, production at the refinery once again ceased, Falcon Refining, Inc. declared bankruptcy, and the facility came under the ownership of American Energy Leasing, Inc. (Ref. 5; pp. 56-109). In May 1990, Impexco of Texas, Inc., acquired the site from American Energy Leasing, Inc. (Ref. 5, pp. 15-55).

National Oil Recovery Corporation (NORCO) gained title to the refinery in December 1990 from Impexco of Texas, Inc (Ref. 5, pp. 15-55). In June 1991, NORCO acquired the dock facility from the Sun Operating Limited Partnership (Ref. 5, pp. 1-5). In the mid-90s, MJP Resources, Inc., began leasing/operating the tanks on the northwest corner of the FM 2725 and Bishop Road and the dock facility. In 1998, Pi Energy Corporation acquired 2.5 acres of the dock facility from NORCO (Ref. 5, pp. 6-14).

Inspection History

The refinery processed material that consisted of not only crude oil but also contained hazardous substances as defined by 40 CFR Part 261.32. In a Notification of Hazardous Waste Activity, signed on October 20, 1980 by Mr. Eugene W. Hodge, Vice President of UNI Refining, Inc., four hazardous wastes from specific sources were listed; K048 (dissolved air flotation float), K049 (slop oil emulsion solids), K050 (heat exchanger bundle cleaning sludge), and K051(API separator sludge) (Ref. 7, pp. 1-2). Of these sources, the listed hazardous waste K051, API separator sludge from the petroleum refining industry based on the toxicity of the sludge, was documented in an inspection report to have been deposited inside the walls of a tank berm (Ref. 39, p. 3; Ref. 40, p. 8). Other hazardous substances at the site include; vinyl acetate detected inside tanks during a EPA Criminal Investigation Division (CID) criminal investigation and a TNRCC Region 14 sampling event (Ref. 27, p.1; Ref. 30, pp. 4-9; Ref. 31, pp. 3, 4, 15, 19), the chromium detected in deposited cooling tower sludges (Ref. 9, pp. 11, 18), and untreated wastewater release inside tank berms (Ref. 9, p. 10).

On March 12, 1986, an inspection conducted by the Texas Water Commission revealed that the Falcon Refinery had disposed of cooling tower sludges on-site. These sludges were sampled and revealed Total Chromium of 8020 mg/kg and EP Tox Chromium of 46 ug/kg (Ref. 9, p. 11). As stated in the inspection report, "When asked about the generation and disposition of cooling tower sludge, the refinery manager stated the cooling tower basin had been cleaned out and that sludge was 'dumped on the ground'"(Ref. 9, p. 18). The inspector noted that, during December 1985, the Falcon Refinery made a 100,000 barrels run of slop oil which generated a substantial amount of very odorous wastewater. The refinery's wastewater treatment system was inoperable during this run. The refinery placed untreated wastewater in tankage and then, ultimately, discharged the untreated wastewater into sandy, unlined containment structures (fire walls) (Ref. 9, p. 19). According to a 1986 inspection report map, the untreated wastewater was discharged into the bermed areas around tanks 10, 11, 26, and 27 (Ref. 9, p. 10). A sludge which had been dumped inside the fire walls of tank 13 was observed and sampled during the inspection of July 1986 by TNRCC Region 14 staff. Constituents found in the sample included naphthalene, 2,4-dimethylphenol, acenaphthene, fluorene, phenanthrene, fluoranthene, pyrene, and chrysene (Ref. 9, pp. 10, 13, 18).

On January 13, 1987, TACB took a sample from a wastewater storage tank at Falcon Refining. Records indicate that the refinery received 104,000 barrels (bbl) of material from Tenneco in January 1986. A substantial amount of this waste remains in the pipelines and tanks. TACB officials noted that noxious odor complaints from surrounding residents began when the refinery started processing this material. TACB concluded that the Tenneco material was not virgin petroleum, but a mixture of organic solvents and, probably, waste. TACB analytical results from a sample of material taken from a tank on January 13, 1987 support the conclusion that this material contained constituents not normally occurring in crude oil (Ref. 10, p. 11). Butanol, cyclohexanediol, 1 phenylethanol, N,N-diphenylamine, and xylene were detected in the sample of wastewater from the refinery (Ref. 11, pp. 1-2).

An Inspection by the Texas Air Control Board (TACB) on April 10, 1987 revealed a black, liquid substance beneath a pipeline rack on the north side of the refinery from a leak in the third pipeline (10-inch

diameter) from Bishop Road (Ref. 46, p. 9). The black, thin liquid appeared to be either a solvent with hydrocarbon/carbon or a crude oil with solvents intermixed. The pipeline connects the tank farm in the refinery to a run-of-pipe from the docks which were used to transfer material into and out of the Falcon Refinery tank farm. The final spill covered an area approximately 30 feet by 60 feet (Ref. 10, p. 7). Investigations April 20 and 21, 1987 did not indicate any apparent effort to remove the spilled material, which was creating an odor problem. ARM Refining, located on the west side of FM 2725 and on the north side of Bishop Road, covered the spill on April 22, 1987 (Ref. 46, p. 1).

On November 15, 1995, a spill was reported south-southeast of FM 2725 on Bishop Road, in the wetlands adjacent to the Brown & Root Facility. The spill occurred during an hydrostatic test of a pipeline prior to bringing the line back into service. The underground pipeline runs from the dock facility to the main facility. Approximately less than eight barrels of "crude oil" were spilled (Ref. 33, pp. 1-2). According to Mr. Bernie Eickel of the Texas Railroad Commission, the sample analyses on February 7, 1996 indicated the presence of substances other than crude oil (Ref. 34, p. 1). Two contaminated soil piles and two roll-off containers containing regulated waste associated with the spill resulted from the waste removal activity (Ref. 35, pp. 37-41). Analyses of the February 7, 1996 samples (collected from one roll-off and liquid material leaking from the roll-off) indicated constituents not normally found in crude oil and elevated levels of the following constituents: tetrachloroethene, 2-methylnapthalene, phenanthrene, toluene, and total xylenes (Ref. 35, pp. 3-14).

On February 16 and 19, 1996, an inspection was conducted by the TNRCC Region 14 staff at the NORCO facility in response to an alleged crude oil pipeline spill from the facility on November 15, 1995. Access was granted by Mr. Michael R. Ward, President of MJP Resources, to whom the NORCO facility was leased. Analysis of the spilled residuals reveals constituents not naturally occurring in crude oil (Ref. 25, p. 1). Mercury, lead, 1,2, dichloroethane, benzene, ethyl benzene, styrene, toluene, total xylenes, chrysene, m-creosol, o-creosol, p-creosol, fluorene, methyl isobutyl ketone, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, methyl t-butyl ether, total organic halogens, and vinyl acetate were detected in the samples collected (Ref. 26, pp. 15-54; Ref. 31, pp. 7-26; Ref. 32, pp. 4-13). Vinyl acetate was detected in tanks N1 and N2 (Ref. 31, pp. 3, 4, 15, 19). Vinyl acetate is not an ingredient in crude oil nor does it substitute for other products as it has no solvent properties, thus exempting the chemical from the petroleum exclusion (Ref. 12 p. 1).

On April 4, 1996, Jones & Neuse conducted grid sampling at the spill site. The samples were analyzed for benzene, toluene, ethyl benzene, and xylene (BTEX) and total petroleum hydrocarbons (TPH). No BTEX content was detected in the soil samples taken, but TPH levels were detected ranging from 67 to 1930 mg/kg (Ref. 36, pp. 7-22). According to Craig Santana with Alamo Petroleum Exchange (APE), MR. Ward hired APE to clean up the November 15, 1995 MJP Dock pipeline spill. APE placed the liquids cleaned up from the spill in two tanks at NORCO (Ref. 27, p. 1; Ref. 37, p. 2).

The EPA CID of the Houston Area Office conducted a criminal investigation from January 1996 until August 2000 on the activities at Gulf Conservation Corporation (GCC), a facility located north of the dock facility, at the NORCO facility which was being operated by MJP Resources, Inc. (Ref. 27, p. 1). Specifically, the investigation concerned a vinyl acetate slop stream delivered to GCC. According to Mr.

Ronald Cady, Louisiana Department of Environmental Quality Regional Hazardous Waste Coordinator, and Mr. Brian Lynch, CID, this stream consisted of odorless mineral spirits (OMS) that were used as a carrier for the reactant in the production of polyethylene at Westlake Polymers in Sulphur, Louisiana. In this process, the mineral spirits are recycled until they become too contaminated to use and would be classed as a spent solvent. Westlake Polymers segregates the two streams and labels them V-240 (OMS) and V-242 (OMS with VA). In the past they had been classifying the mineral spirits as a co-product(Ref. 28, p. 1). The vinyl acetate is not an excluded substance under the petroleum exclusion. According to Mr. Mike Ward, GCC owner Mr. Jimmy Dupnik stored material from GCC in at least one tank at the NORCO facility (Ref. 29, p. 3).

Samples were collected by the CID in February 1996 from the two tanks (N1 and N2, also referred to as 32 and 33) in the main processing area of the NORCO facility (Figure Ref. 30, pp. 3, 4, 5, 9). The liquid samples collected revealed high concentrations of vinyl acetate in two tanks; 1,360,000 ug/L and 36,600,000 ug/L (Ref. 30, pp. 2-9). The case was declined to be prosecuted by the United State Attorney office, Southern District, Texas (Ref. 27, p. 1).

On January 4, 2000, TNRCC Region 14 inspectors completed a compliance inspection pertaining to the air quality requirements for permitted tanks. These tanks are located the northwest quadrant of the FM 2725 and Bishop Road and are authorized in three active TNRCC air permits. The naphtha stabilizer unit, located in the main processing area in the southeast quadrant of FM 2725 and Bishop Road, was observed to be leaking from a valve between the sight glass and the tank. This valve was approximately 20 feet high and the wind was blowing a shower of leaking fluid onto an area of soil and vegetation surrounding the tank. Two 8-ounce jars of sample were collected of the liquid as it leaked from the valve (Ref. 38, pp. 19-20). Based upon the flow rate of the leak observed on January 7, 2000, and the site inspections conducted on January 4, 6, 7, 10, and 11, 2000, it was determined by the TNRCC Region Office that a total volume of at least 220 gallons of material had leaked from the tank (Ref. 38, pp. 22). Ground water at the NORCO facility has been contaminated as a result of the release, per the March 7, 2000 report. Laboratory analyses received by the TNRCC Region 14 Office on February 25, 2000 revealed the following constituents; 1,2 dichloroethane, 4-methyl-2-pentanone (Ref. 38, p. 180), benzene, ethyl benzene, m,p,o-xylenes, styrene, and toluene (Ref. 38, pp. 44-50). The analyses also revealed that the fluid sample exceeded the maximum concentration of benzene for toxicity characteristic using the TCLP (Ref. 38, p. 22).

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## TABLES

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## FIGURES

## NOTES TO THE READER

The following rules were used when citing references in the Documentation Record:

1. All references attached to this report have been stamped with a designated page number (example: Ref. 1, p. 10 = 001 00010). However, if the reference being cited has an original page number, that page number was cited. If the reference being cited has no original page number or the pagination is not complete, then the designated page number is cited.

2. The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

**HRS DOCUMENTATION REPORT**
**REVIEW COVER SHEET**

**SITE NAME:** FALCON REFINERY

**CONTACT PERSON:**

| | | |
|---|---|---|
| Documentation: | Brenda Cook, USEPA<br>Region 6 NPL Coordinator | 214/665-8372 |

**Pathway, Components, or Threats Not Evaluated**

### Ground Water Pathway

The Ground Water Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

### Soil Exposure Pathway

The Resident Population Threat, and Nearby Population Threat, were not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

### Air Migration Pathway

The Air Migration Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

## HRS DOCUMENTATION RECORD

**Name of Site:** Falcon Refinery **Date Prepared:** 01/02

**CERCLIS Site ID Number:** TXD086278058

**Street Address of Site:** NW and SE intersection of FM 2725 and Bishop Road

**City, County, State:** Ingleside, San Patricio County, Texas

**General Location in the State:**
The Falcon Refinery is located 1.7 miles SE of State Highway 361 on FM 2725 at the northwest and southeast corners of FM 2725 and Bishop Road east of Ingleside. This site is situated along the southern Gulf Coast of Texas (See Figure 1a for Regional Location Map, Figure 1b for Site Location Map, and Figure 1c for Site Detail Map).

**Topographic Map:** U.S. Geological Survey 7.5 Minute Topographic Map, Port Ingleside Quadrangle. Photo revised 1975 (Ref. 4).

**Latitude:** 27° 51' 38.61" North **Longitude:** 97° 10' 45.50" West
The geographic coordinates represent the entrance to the main process area and were measured from the entrance on Bishop Road.

**EPA Region 6**

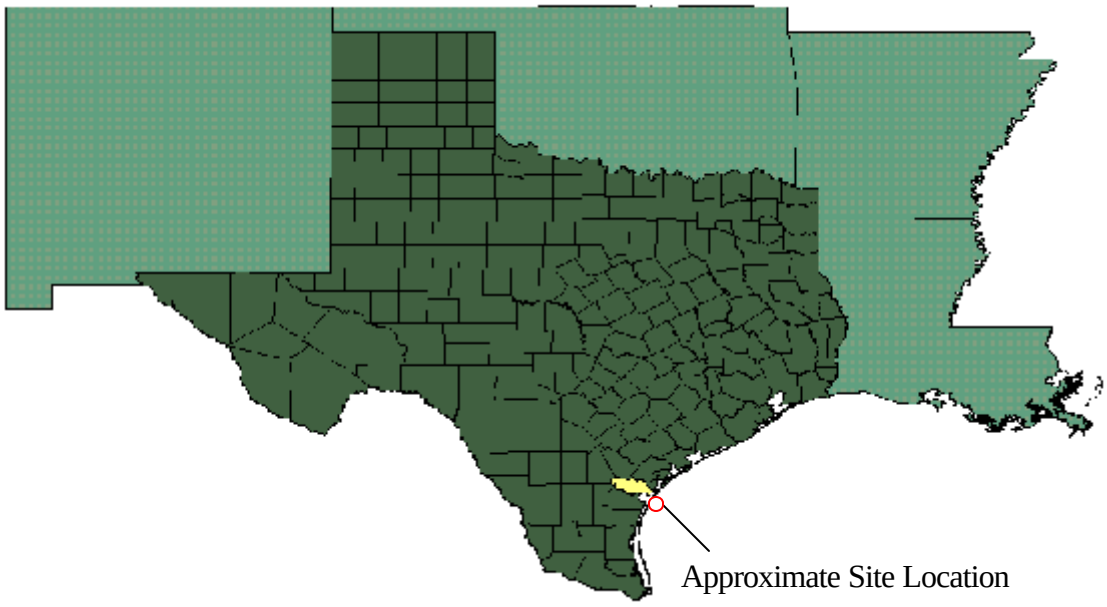

Figure 1a Regional Location Map
A copy of this figure is available at the EPA Docket Center

U.S. EPA Docket Center
EPA West Room B102
1301 Constitution Avenue, NW
Washington DC, 20460
Telephone: 703-603-9232
Email: superfund.docket@epa.gov

Figure 1b Site Location Map
A copy of this figure is available at the EPA Docket Center

U.S. EPA Docket Center
EPA West Room B102
1301 Constitution Avenue, NW
Washington DC, 20460
Telephone: 703-603-9232
Email: superfund.docket@epa.gov

Figure 1c Site Detail Map
A copy of this figure is available at the EPA Docket Center

U.S. EPA Docket Center
EPA West Room B102
1301 Constitution Avenue, NW
Washington DC, 20460
Telephone: 703-603-9232
Email: superfund.docket@epa.gov

WORKSHEET FOR COMPUTING HRS SITE SCORE

| | | S | $S^2$ |
|---|---|---|---|
| 1. | Ground Water Migration Pathway Score ($S_{gw}$) (from Table 3-1, line 13) | NS | |
| 2a. | Surface Water Overland/Flood Migration Component (from Table 4-1, line 30) | 100 | 10,000 |
| 2b. | Ground Water to Surface Water Migration Component (from Table 4-25, line 28) | NS | |
| 2c. | Surface Water Migration Pathway Score ($S_{sw}$) Enter the larger of lines 2a and 2b as the pathway score. | 100 | 10,000 |
| 3. | Soil Exposure Pathway Score ($S_s$) (from Table 5-1, line 22) | NS | |
| 4. | Air Migration Pathway Score ($S_a$) (from Table 6-1, line 12) | NS | |
| 5. | Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$ | | 10,000 |
| 6. | **HRS Site Score** Divide the value on line 5 by 4 and take the square root. | | 50 |

NS = Not Scored

**SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

| Factor Categories and Factors | | | Maximum Value | Value Assigned | |
|---|---|---|---|---|---|
| DRINKING WATER THREAT | | | | | |
| **Drinking Water Threat Score** | | | | | |
| 1. | Observed Release | | 550 | 550 | |
| 2. | Potential to Release by Overland Flow: | | | | |
| | 2a. | Containment | 10 | NS | |
| | 2b. | Runoff | 25 | NS | |
| | 2c. | Distance to Surface Water | 25 | NS | |
| | 2d. | Potential to Release by Overland Flow | | | |
| | | (Lines 2a x (2b + 2c)) | 500 | NS | |
| 3. | Potential to Release by Flood: | | | | |
| | 3a. | Containment (Flood) | 10 | NS | |
| | 3b. | Flood Frequency | 50 | NS | |
| | 3c. | Potential to Release by Flood | | | |
| | | (Lines 3a x 3b) | 500 | NS | |
| 4. | Potential to Release | | | | |
| | (Lines 2d + 3c, subject to a maximum of 500) | | 500 | NS | |
| 5. | Likelihood to Release | | | | |
| | (Higher of Lines 1 and 4) | | 550 | | 550 |
| **Waste Characteristics** | | | | | |
| 6. | Toxicity/Persistence | | * | NS | |
| 7. | Hazardous Waste Quantity | | * | NS | |
| 8. | Waste Characteristics | | 100 | | NS |
| **Targets** | | | | | |
| 9. | Nearest Intake | | 50 | NS | |
| 10. | Population: | | | | |
| | 10a. | Level I Concentrations | ** | NS | |
| | 10b. | Level II Concentrations | ** | NS | |
| | 10c. | Potential Contamination | ** | NS | |
| | 10d. | Population (Lines 10a + 10b + 10c) | ** | NS | |
| 11. | Resources | | 5 | NS | |
| 12. | Targets (Lines 9 + 10d + 11) | | ** | | NS |

**SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

DRINKING WATER THREAT (Concluded)

| Factor Categories and Factors | | | Maximum Value | Value Assigned |
|---|---|---|---|---|
| **Drinking Water Threat Score** | | | | |
| 13. | Drinking Water Threat Score ((Lines 5 x 8 x 12)/82,500, subject to a maximum of 100) | | 100 | NS |
| HUMAN FOOD CHAIN THREAT | | | | |
| **Likelihood of Release** | | | | |
| 14. | Likelihood of Release (Same value as Line 5) | | 550 | 550 |
| **Waste Characteristics** | | | | |
| 15. | Toxicity/Persistence/Bioaccumulation | | * | $2 \times 10^8$ |
| 16. | Hazardous Waste Quantity | | * | 100 |
| 17. | Waste Characteristics | | 1,000 | 320 |
| **Targets** | | | | |
| 18. | Food Chain Individual | | 50 | 20 |
| 19. | Population: | | | |
| | 19a. | Level I Concentrations | ** | 0 |
| | 19b. | Level II Concentration | ** | 0 |
| | 19c. | Potential Human Food Chain Contamination | ** | 0.0000006 |
| | 19d. | Population (Lines 19a + 19b + 19c) | ** | 0.0000006 |
| 20. | Targets (Value from Lines 18 + 19d) | | ** | 20.0000006 |
| **Human Food Chain Threat Score** | | | | |
| 21. | Human Food Chain Threat Score ((Lines 14 x 17 x 20)/82,500 subject to a maximum of 100) | | 100 | 42.67 |

**TABLE 4-1**
**SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET**

| Factor Categories and Factors | | | Maximum Value | Value Assigned | |
|---|---|---|---|---|---|
| ENVIRONMENTAL THREAT | | | | | |
| **Likelihood of Release** | | | | | |
| 22. | Likelihood of Release (Same Value as Line 5) | | 550 | | 550 |
| **Waste Characteristics** | | | | | |
| 23. | Ecosystem Toxicity/Persistence/ Bioaccumulation | | * | $5x10^8$ | |
| 24. | Hazardous Waste Quantity | | * | 100 | |
| 25. | Waste Characteristics | | 1,000 | | 320 |
| **Targets** | | | | | |
| 26. | Sensitive Environment: | | | | |
| | 26a. | Level I Concentrations | ** | 0 | |
| | 26b. | Level II Concentrations | ** | 275 | |
| | 26c. | Potential Contamination | ** | NS | |
| | 26d. | Sensitive Environments (Lines 26a + 26b + 26c) | ** | 275 | |
| 27. | Targets (Value from Line 26d) | | ** | | 275 |
| **Environmental Threat Score** | | | | | |
| 28. | Environmental Threat Score ((Lines 22 x 25 x 27)/82,500, subject to a maximum of 60) | | 60 | | 60 |
| SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED | | | | | |
| 29. | WATERSHED SCORE*** (Lines 13 + 21 + 28, subject to a maximum of 100) | | 100 | | 100 |
| SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE | | | | | |
| 30. | Component Score ($S_{of}$)*** (Highest score from Line 29 for all watersheds evaluated, subject to a maximum of 100) | | 100 | | 100 |

## REFERENCE LISTING


| Reference Number | Description of the Reference |
|---|---|
| 1. | U.S. Environmental Protection Agency. Federal Register - 40 CFR Part 300; Hazard Ranking System; Final Rule, Volume 55, No. 241, December 14, 1990. 1 page. |
| 2. | U.S. Environmental Protection Agency. Hazard Ranking System Guidance Manual, Office of Emergency and Remedial Response, Publication 9345.1-07, November, 1992. 1 page. |
| 3. | U.S. Environmental Protection Agency. Superfund Chemical Data Matrix (SCDM). June 1996. 1 page. |
| 4. | U.S. Geological Survey. 7.5 Minute Topographic Map, Port Ingleside Quadrangle. Photo revised 1975. 1 sheet. |
| 5. | Ownership Records. 1978-1998. 180 pages. |
| 6. | TNRCC. Transmittal of an application for Renewal of Permit No. 02142, National Oil Recovery Corporation, Industrial. November 14, 1994. 14 pages. |
| 7. | U.S. Environmental Protection Agency. Notification of Hazardous Waste Activity. Uni Refining, Inc. TXD086278058. October 20, 1980. 2 pages. |
| 8. | 40 Code of Federal Regulations - CHAPTER I - PART 302. http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr302_00.html. 50 FR 13474. April 4, 1985. 74 pages. |
| 9. | Texas Water Commission. FRC Energy Corporation dba Falcon Refining, Texas Registration No. 31288. June 5, 1986. 20 pages. |
| 10. | U.S. Environmental Protection Agency. Potential Hazardous Waste Site: Site Inspection Report: Falcon Refinery (AKA UNI, Midgulf, & FRC) TXD 086278058. December 14, 1987. 35 pages. |
| 11. | Texas Air Control Board (TACB). Falcon Refining Co. Received March 7, 1986. 2 pages. |
| 12. | State of Louisiana, Department of Environmental Quality. Re: V240 and V242 Mineral Spirits. July 22, 1996. 1 page. |
| 13. | May 16-18, 2000 Expanded Site Inspection (ESI) Site Photographs. 49 pages. |

**REFERENCE LISTING** (continued)


14. May 11, 16-18, 2000. ESI Field Log Notes. 63 pages.

15. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group F02J2.* July 28, 2000. 172 pages.

16. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group MF00NH.* June 28, 2000. 40 pages.

17. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group MF00NK.* June 28, 2000. 38 pages.

18. Cordell, Melissa. TNRCC. Record of Communication. Subject: Sample Location Information from the Falcon Refinery Expanded Site Inspection. December 23, 2001. 3 pages.

19. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group F02H1.* 175 pages.

20. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group MF00N4.* 37 pages.

21. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group F02J0.* 97 pages.

22. TNRCC. Quality Assurance Project Plan for TNRCC Preliminary Assessment/Site Inspection Program (FY 2000-2001). October 1999. 23 pages.

23. Texas Department of Transportation (TXDOT). Nueces County Aerial Photograph #327764. October 31, 1979. 2 photos.

24. Love, Gary. TXDOT. Telephone Memo to File. October 29, 2001. 1 page.

25. TNRCC. Re: National Oil Recovery Corporation - Ingleside Facility, Solid Waste Registration No. 31288. February 23, 1996. 3 pages.

26. TNRCC. Chain of Custody and Sample Results. March 7, 1996. 76 pages.

**REFERENCE LISTING** (continued)


27. Lynch, Brian. TNRCC. Electronic Mail: NORCO Facility, Ingleside, Texas. October 25, 2001. 2 pages.

28. Cady, Ronald. Louisiana Department of Environmental Quality. Electronic Mail: (Mineral Spirits and Vinyl Acetate) from Westlake Polymers in Sulphur, LA. October 30, 2001. 1 page.

29. Ward, Michael. MJP Resources, Inc. USEPA Criminal Investigation Division: Memorandum of Interview. February 17, 1996. 5 pages.

30. U.S. Environmental Protection Agency. Region 6 Houston Laboratory. Sample results from samples collected on February 16, 23, 1996 at National Oil Recovery Corporation facility. March 27, 1996. 9 pages.

31. Core Laboratories Analytical Report. Job Number 960507. March 5, 1996. 44 pages.

32. Core Laboratories Analytical Report. Job Number 960521. March 19, 1996. 30 pages.

33. TNRCC. Oil or Hazardous Substances Discharge or Spill or Air Release Report. November 15, 1995. 3 pages.

34. Eickel, Byron. Texas Railroad Commission. Telephone Memo to File. February 23, 1996. 1 page.

35. TNRCC. Re: MJP Resources Pipeline Spill. March 1, 1996. 50 pages.

36. Duncan, Anthony. Jones & Neuse, Inc. Re: Progress Report - MJP Resources and Gulf Conservation Corporation. April 29, 1996. 53 pages.

37. Santana, Craig. Alamo Petroleum Exchange. TNRCC Special Investigations - Report of Interview: Westlake Polymers. February 15, 1996. 2 pages.

38. TNRCC. Notice of Enforcement for the Air and Waste Compliance evaluation Inspections, Sampling Inspection, and Complaint Investigation at: National Oil Recovery Corporation - Ingleside Facility. March 7, 2000. 183 pages.

39. U.S. Environmental Protection Agency. Potential Hazardous Waste Site: Identification and Preliminary Assessment: Falcon Refinery TXD 086 278 058. June 11, 1987. 5 pages.

**REFERENCE LISTING** (continued)


40. Texas Department of Water Resources (TDWR). Interoffice Memorandum: Uni Refining, Inc., Solid Waste Registration 31288. February 25, 1982. 11 pages.

41. Kutchinski, Paul. Texas Department of Water Resources. UNI Refining, Inc. April 27, 1982. 25 pages.

42. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group F02J4.* July 28, 2000. 140 pages.

43. U.S. Environmental Protection Agency. *Region 6, CLP Analytical Data for Falcon Refinery Site, Case #28064, Sample Designation Group MF00NM.* July 28, 2000. 23 pages.

44. May 11, 2000. Site Photographs. 4 pages.

45. Kutchinski, Paul. Texas Department of Water Resources. Subject: UNI Oil, Solid Waste Registration #31288. July 2, 1979. 2 pages.

46. Palmer, W.T. TACB. Letter to Mr. Claude Richey, Falcon Refining Company. April 23, 1987. 13 pages.

47. Hayes, W.A. Shiner, Moseley and Associates, Inc. Letter to Mr. Monico Banda TNRCC Office of Air Quality. December 28, 1995. 2 pages.

48. The Dallas Morning News. Texas Almanac 2000-2001. College Station: Texas A&M Distributing Press Consortium. 1999. 3 pages.

49. Dunne, Thomas and Luna B. Leopold. Water in Environmental Planning. New York: W.H. Freeman and Company. 1978. 3 pages.

50. Federal Emergency Management Agency. Flood Insurance Rate Map: San Patricio County, Texas. Panel 531 of 533. Map Revised: March 18, 1985. 1 page.

51. TNRCC. 1996 State of Texas Water Quality Inventory, Volume 4. 17 pages.

52. Jones, Gerald L. Falcon Refinery Company. Purchase of Texas Independent Refining. January 21, 1986. 1 page.

53. U.S. Department of the Interior, Fish and Wildlife Service. National Wetlands Inventory Map, Port Ingleside, Texas. Draft April 3, 1995. 1 sheet.

**REFERENCE LISTING** (continued)


54. TNRCC. 1996 Regional Assessment of Water Quality in the Nueces Coastal Basins. October 1996. 29 pages.

55. U.S. Department of the Interior, Fish and Wildlife Service. National Wetlands Inventory Map, Port Aransas, Texas. Draft March 29, 1995. 1 sheet.

56. U.S. Environmental Protection Agency. Quick Reference Fact Sheet: Using Qualified Data to Document an Observed Release and Observed Contamination, Office of Emergency and Remedial Response, Publication 9285.7-14, November, 1996. 18 pages.

57. TNRCC to Plains Terminal and Transfer. Re: PLX Ingleside, INC. Solid Waste Registration #31080. April 3, 1996. 46 pages.

58. Bowles, William F. Texas Water Commission. Annual Solid Waste Compliance Inspection of ARM Refining Company - Registration No. 31080. January 14, 1986. 3 pages.

59. Culbert, Josh. Plains Marketing. Telephone Memo to File. October 8, 2001. 1 page.

60. Gibbs, Mark S., P.E. Exemption Registration No. 41264 - Rock Crusher. May 24, 1999. 5 pages.

61. TNRCC. TNRCC FY2001 RCRIS Compliance Monitoring and Enforcement Log. Aker Gulf Marine - Aransas Pass Yard. SWR 37946. February 26, 2001. 44 pages.

62. TNRCC. Aker Gulf Marine: Permit to Dispose of Wastes. January 4, 2000. 15 pages.

63. Scott, Walter. Alamo Concrete Products, LTD. Facsimile: Location of Alamo Concrete Products, LTD. April 25, 2000. 2 pages.

64. Walsh, Allen. Alamo Concrete Products, LTD. Change of Ownership Notification. April 4, 1996. 1 page.

65. Picton, Harold H. Coast Materials, Inc. TACB: Registration Form for Standard Exemptions - Form PI-7. July 20, 1988. 5 pages.

66. Burgin, Shane. Brown & Root, Inc. Cancellation of Notice of Registration. November 24, 1993. 3 pages.

**REFERENCE LISTING** (continued)


67. TNRCC. LPST Database Query Results: Brown & Root, Inc. LPST 103443. August 22, 2001. 1 page.

68. TACB. Brown & Root Development, Inc. Permit Application. May 14, 1985. 8 pages.

69. Kulkarni, R.D., P.E. Petro Project Engineering, Inc. Ingleside, Properties, Inc. Ingleside, TX, TACB Permit Application. May 7, 1984. 10 pages.

70. TNRCC. Re: Gulf Conservation Corporation Spill. December 20, 1996. 2 pages.

71. Core Lab. Analytical Report Job Number: 964566. September 24, 1996. 17 pages.

72. Stanley, Carlton H. TNRCC. Spill of Regulated Substance at Gulf Conservation Corporation. March 5, 1996. 9 pages.

73. Tunnell, J.W. et al. Current Status and Historical Trends of the Estuarine Living Resources within the Corpus Christi Bay National Estuary Program Study Area. January 1996. 39 pages.

74. Robinson, L., P. Campbell, and L. Butler. Trends in Texas Commercial Fishery Landings, 1972-1997. Texas Parks and Wildlife, Management Data Series No 158. 1998. 31 pages.

75. Hardegree, Beau, Seagrass Coordinator -Resource Protection Division, Texas Parks and Wildlife Department. Electronic Mail. To: Melissa Cordell, Texas Natural Resource Conservation Commission. October 1, 2001. 1 page.

76. U.S. Geological Survey. DOQQ Metadata for Port Ingleside NE. ftp://ftp.tnris.state.tx.us/1mdoqq/ January 7, 1995. 9 pages.

77. TNRCC. One Meter Digital Orthophoto Quarter Quads. http://home.tnrcc.state.tx.us/internal/gis/metadata/doq_met.html. August 25, 2000. 11 pages.

78. Texas Parks & Wildlife. Endangered/Threatened Species near Falcon Refining. October 23, 2000 and September 26, 2000. 9 pages.

79. TACB. Inter-Office: Public Hearing Requests, Uni Oil, Incorporated. September 21, 1978. 4 pages.

80. Barnes, Philip G. Texas Independent Oil Corporation. Re: PSD-TX-229. July 17, 1981. 1 page.

81. Texas Department of Water Resources. Interoffice Memorandum: MidGulf Energy (formerly Uni Refining, Inc.) Solid Waste Registration No. 31288. March 28, 1984. 7 pages.

## SOURCE DESCRIPTION

## 2.2 SOURCE CHARACTERIZATION

### 2.2.1 Source Identification

Number of the source: 1

Name and description of the source: Contaminated Soil (Associated with Bermed Areas Around Tanks 10, 11, 26, and 27)

Falcon Refinery, a.k.a. National Oil Recovery Corporation, discharged refinery process wastewater plus other refinery effluent streams and runoff to an outlet located in Corpus Christi Bay under NPDES Permit # TX0076635, issued on December 17, 1986 and under Texas Water Quality Permit #02142 issued on July 10, 1989. The raw water (approximately 240,000 gallons/day) was obtained from the City of Ingleside and/or company wells. Process wastewater (steam condensate and desalter effluent) was routed to an oil/water API separator. Rainfall runoff from the two process areas (total area of about 26,000 square feet) was routed to a 5,000 barrel holding tank and released at a controlled rate to the oil/water separator. The process wastewater and the process area runoff were then combined and routed to an air flotation unit and an aeration basin (designed for 5 days retention time) and then pumped by pipeline to the receiving waters (Ref. 6, p. 3).

In a Notification of Hazardous Waste Activity, signed on October 20, 1980 by Mr. Eugene W. Hodge, Vice President of UNI Refining, Inc., four hazardous wastes from specific sources were listed: K048, K049, K050, and K051 (Ref. 7, pp.1-2). Of these sources, the listed hazardous wastes K048, dissolved air flotation (DAF) float from the petroleum refining industry, and K051, API separator sludge from the petroleum refining industry, were associated with this wastewater treatment system (Ref. 8, p. 47).

During the May 2000 sampling event at the site, these berms were not intact (Ref. 44, p. 4, Photo 7). During the 1987 EPA Site Inspection, a breech in the dyke integrity of the tank containment areas at the back row of tanks was observed (Ref. 10, p. 19, Photo 13, p. 26). The possible runoff path into the wetland area at the rear of the facility was observed (Ref. 10, Photos 11-12, p. 25).

Samples SO-18 (F02JZ/MF00PG), SO-22 (F02K3/MF00PL), and SO-23 (F02K4/MF00PM) were collected from Source 1 during the May 2000 TNRCC sampling event (Tables 1-2; Ref. 14, pp. 22, 27). The associated information on background soil samples are in Tables 3-4.

**Location of the source, with reference to a map of the site:**
See Figure 2, Source Sample Location Map.

**Source type for HRS evaluation purposes:** Contaminated Soil (Associated with Bermed Areas Around Tanks 10, 11, 26, and 27)

**Containment**

**Gas release to air:** The air migration pathway was not evaluated; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not evaluated; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water migration pathway was not evaluated; therefore, a release to ground water was not evaluated.

**Release via overland migration and/or flood:** Source consists of contaminated soil. There is no liner present to prevent the migration of hazardous substances. Source 1 will be evaluated as "Contaminated Soil". Based on evidence of hazardous substance migration and the lack of a maintained engineered cover or a functioning run-on control system and runoff management system, a Containment factor value of 10 is assigned to the source as specified in Table 4-2 of the HRS Rule (Ref. 1, Table 4-2).

Figure 2 Source Sample Location Map
A copy of this figure is available at the EPA Docket Center

U.S. EPA Docket Center
EPA West Room B102
1301 Constitution Avenue, NW
Washington DC, 20460
Telephone: 703-603-9232
Email: superfund.docket@epa.gov

## 2.2.2 Hazardous Substances Associated With A Source

**Table 1**
**Sample Collection for Source No. 1 - Contaminated Soil**

| Station/ CLP ID | Sample Location | Sample Depth | Date Collected | Location Reference |
|---|---|---|---|---|
| SO-18 F02JZ/MF00PG | Source No. 1 - Located east of Tank 26 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 15, Roll 1, Photo 30; Ref. 14, p. 27; Ref. 18, p. 2 |
| SO-22 F02K3/MF00PL | Source No. 1 - Located east of Tank 10 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 15, Roll 1, Photo 29; Ref. 14, p. 22; Ref. 18, p. 2 |
| SO-23 F02K4/MF00PM (Duplicate of SO-22) | Source No. 1 - Located east of Tank 10 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 15, Roll 1, Photo 29; Ref. 14, p. 22; Ref. 18, p. 2 |

| Table 2<br>Source Characterization Table for Source No. 1 - Contaminated Soil | | | |
|---|---|---|---|
| **Hazardous Substances** | **Evidence** | | |
| | **SO-18<br>F02JZ/MF00PG** | **SO-22<br>F02K3/MF00PL** | **SO-23<br>F02K4/MF00PM<br>(Duplicate of SO-22)** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | | |
| Chrysene | 85LJ [380] | 2000LJ [3700] | **4800 [4000]** |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL]** | | | |
| Arsenic | 1.1 LJv [2.4] | **7.7 [2.3]** | 0.78L [2.5] |
| Chromium | 2.1L [2.4] | **83.2 J [2.3]** | 2.0LJ [2.5] |
| Copper | **8.5 [6.0]** | **64.2 J [5.8]** | 1.3LJ [6.3] |
| Manganese | 106 [3.6] | **271J [3.5]** | 101J [3.8] |
| Nickel | 1.4 LJv [9.7] | **57.5J [9.3]** | 1.5LJ [10.1] |
| Analytical Reference | Ref. 15, pp. 16, 17, 29, 117-19, 159; Ref. 17, pp. 10, 16, 37 | Ref. 15, pp. 18, 19, 29, 123-25, 161-62; Ref. 16, pp. 10, 17, 28 | Ref. 15, pp. 18, 19, 29, 126-28, 163-64; Ref. 16, pp. 10, 16, 29 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.

[ ] = Sample Quantitation Limit.

J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

v = Low biased. Estimated concentration may be higher than the concentration reported.

Inorganics: L = Reported concentration is between the IDL and the CRDL.

**Table 3**
**Background Sample Locations for Source No. 1- Contaminated Soil**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-20 F02K1/MF00PJ | Undeveloped section of land on Sassy's Pit Stop property off west side of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 1, Roll 1, Photo 1, Ref. 14, p. 2; Ref. 18, p. 2 |
| SO-21 F02K2/MF00PK | Undeveloped section of land on the east side of FM 2725 and north of Garrett Road | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 19, Roll 2, Photo 5, Ref.14, p. 43; Ref. 18, p. 2 |

**Table 4**
**Background Sample Table for Source No. 1 - Contaminated Soil**

| Hazardous Substance | Evidence | |
|---|---|---|
| | SO-20 F02K1/MF00PJ | SO-21 F02K2/MF00PK |
| **Semivolatile Organics Concentrations in ug/Kg [SQL]** | | |
| Chrysene | ND [330] | ND [350] |
| **Inorganics Concentrations in mg/Kg [SQL]** | | |
| Arsenic | ND [2.09] | 1.9 LUC [2.12] |
| Chromium | 0.74 LJ ^ [2.09] | 2.1 L [2.12] |
| Copper | 1.1 LJ^ [5.23] | 1.7 L [5.30] |
| Manganese | 21.0 J^ [3.14] | 42.8 [3.18] |
| Nickel | ND [8.37] | 1.9 L [8.47] |
| Analytical Reference | Ref. 19, pp. 17, 18, 29, 150-52; Ref. 20, pp. 11, 17, 36 | Ref. 21, pp. 13, 20, 79-81; Ref. 16, pp. 9, 16, 27 |

General: [ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.
Inorganics: L = Reported concentration is between the IDL and the CRDL.
^ = High biased. Estimated concentration may be lower than the concentration reported.

### 2.2.3 Hazardous Substances Available to a Pathway

Because the containment factor value for Source 1 is greater than 0, the following hazardous substances associated with Source 1 are available to migrate via the surface water pathway:

| | | |
|---|---|---|
| Chrysene | Chromium | Manganese |
| Arsenic | Copper | Nickel |

Soil sample SO-23 was the duplicate of SO-22, but did not have similar concentrations for the same constituents. These samples were collected in the same location and were sampled according to the TNRCC Quality Assurance Project Plan (Ref. 33, pp. 7-13); therefore this data will be used qualitatively to establish the presence of these hazardous substances in Source 1.

Samples collected at the on-site HRS-qualifying wetlands indicate that hazardous substances have already migrated to the surface water pathway (See Section 4.1.2.1).

## 2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to Likelihood of Release to the Surface Water Pathway.

## 2.4 WASTE CHARACTERISTICS

### 2.4.1 Selection of Substance Potentially Posing Greatest Threat

The hazardous substance chrysene is the hazardous substance associated with this source posing the greatest hazard, because it has the highest combined toxicity/persistence/ bioaccumulation value, has been found meeting the observed release criteria for the Surface Water Pathway, and is present in a source with a containment value greater than zero.

Specific factors of the hazardous substances available to the Surface Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (ecosystem toxicity, persistence, and bioaccumulation), are presented under the Surface Water Migration Pathway section of this Documentation Record.

## 2.4.2. Hazardous Waste Quantity

### 2.4.2.1 Source Hazardous Waste Quantity

#### 2.4.2.1.1 Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

#### 2.4.2.1.2 Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

#### 2.4.2.1.3 Volume (Tier C) - NE

The information available is not sufficient to evaluate Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.3).

#### 2.4.2.1.4 Area (Tier D)

For the migration pathways, the source is assigned a value for area using the appropriate Tier D equation from Table 2-5 (Ref. 1, Section 2.4.2.1.4). Since the volume could not be adequately evaluated under Tier C, the area will be evaluated under Tier D.

The following surface area (A) measurements represent the approximate boundaries for Source 1, contaminated soil consisting of four containment areas minus the area of Tanks 10, 11, 26, and 27. Dimensions were determined from the 1979 aerial photograph (Ref. 23, p. 1):

> The equation for assigning Area (Tier D) a Hazardous Waste Quantity Value from Table 2-5 is A/13. Where A (Source 1) / 34,000 = Hazardous Waste Quantity Value. The approximate scale for the 1979 aerial photograph is approximately one inch equals 400 feet (Ref. 24, p. 1). The area measures approximately 156 feet x 164 feet minus tank area (Tank 10), 140 feet x 156 feet minus tank area (Tank 11) (Ref. 38, p. 33), 200 feet x 200 feet minus tank area (Tank 26), and 200 feet x 200 feet minus tank area (Tank 27) (Ref. 38, p. 33; Ref. 23, p.1; Ref. 24, p.1). According to the map included with the inspection report, the process wastewater extended approximately over half of the area contained by berms/fire walls (Ref. 9, p. 10).

Area within the tank berms minus area of tank, Br2, divided by 2, to represent half of the area contained by berms(Ref. 9, p. 10; Ref. 24, p. 1).

Surface impoundment around Tank 10 = [(156 x 164) - B$(42.5)^2$] / 2
(25,584 - 5674.5)/2 = 9,954.8 $ft^2$
Surface impoundment around Tank 11 = [(140 x 156) - B$(30.0)^2$] / 2
(21,840 - 2,827.4)/2 = 9,506.3 $ft^2$
Surface impoundment around Tank 26 = [(200 x 200) - B$(54.5)^2$] / 2
(40,000 - 9,331.3)/2 = 15,334.4 $ft^2$
Surface impoundment around Tank 27 = [(200 x 200) - B$(54.5)^2$] / 2
(40,000 - 9,331.3)/2 = 15,334.4 $ft^2$

Hazardous Waste Quantity Evaluation Equation: Area / 34,000
50,129.9 / 34,000 = 1.47

Hazardous Waste Quantity Value = 1 (Ref. 1, Table 2-6).

### 2.4.2.1.5 Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, pp. Section 2.4.2.1.1).

**SOURCE NO. 1 - CONTAMINATED SOIL**
**SOURCE HAZARDOUS WASTE QUANTITY**

**TABLE 5**

| Tier Measure | Migration Pathway (Surface Water) |
|---|---|
| Tier A, Constituent Quantity | NE |
| Tier B, Wastestream Quantity | NE |
| Tier C, Volume | NE |
| Tier D, Area | 1.47 |

NE = Not Evaluated

**Source No. 1, Contaminated Soil, Hazardous Waste Quantity Value: 1.47**

### 2.2.1 Source Identification

Number of the source: 2

Name and description of the source: Contaminated Soil (Dump Area)

Soil sample SO-26 (F02K7/MF00PQ) was collected southwest of tank 30 and west of tank 31 (Figure 2; Ref. 38, p. 33) to characterize Source 2. There is limited information available regarding the activities that took place at this location. However, the source location and description are based upon a site map, found during the 1996 inspection, designating this area as "dumped benzene 1981" (Tables 6-7; Ref. 26, p. 11). Information on background soil samples is presented in Tables 8-9.

**Location of the source, with reference to a map of the site:**
See Figure 2, Source Sample Location Map.

**Source type for HRS evaluation purposes:** Contaminated Soil (Dump Area)

**Containment**

**Gas release to air:** The air migration pathway was not evaluated; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not evaluated; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water migration pathway was not evaluated; therefore, a release to ground water was not evaluated.

**Release via overland migration and/or flood:** Source consists of contaminated soil. There is no containment and no liner present to prevent the migration of hazardous substances. Source 2 will be evaluated as "Contaminated Soil" with evidence of hazardous substance migration from source area. Based on the lack of a maintained engineered cover or functioning run-on control system and runoff management system, a Containment factor value of 10 is assigned to the source as specified in Table 4-2 of the HRS Rule (Ref. 1, Table 4-2).

## 2.2.2 Hazardous Substances Associated With A Source

| Table 6<br>Soil Source Samples for Source No. 2 - Contaminated Soil | | | | |
|---|---|---|---|---|
| **Station/ CLP ID. No.** | **Sample Location** | **Sample Depth** | **Date Collected** | **Reference** |
| SO-26<br>F02K7/MF00PQ | Southwest of Tank 30 and West of Tank 31 | Grab Sample<br>0" - 6" | 5/17/00 | Ref. 13, p. 27, Roll 2 Photo 22, Ref. 14, p. 49; Ref. 18, p. 2 |

| Table 7<br>Sample Table for Source No. 2 - Contaminated Soil | | |
|---|---|---|
| **Hazardous Substance** | **Evidence** | |
| | **SO-26<br>F02K7** | **Analytical Reference** |
| **Semivolatile Organics<br>Concentrations in ug/Kg** | | |
| Fluoranthene | **470 [370]** | Ref. 15, pp. 13, 27, 132-34 |
| Pyrene | **490 [370]** | |
| Benzo(a) anthracene | **370 [370]** | |
| Chrysene | **580 [370]** | |
| Benzo(b) fluoranthene | **990 [370]** | |
| Benzo(k) fluoranthene | **600 [370]** | |
| Benzo(a)pyrene | **740 [370]** | |
| Indeno(1,2,3-cd) pyrene | **560 [370]** | |
| Benzo(g,h,i)perylene | **610 [370]** | |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.

**Table 8**
**Background Sample Locations for Source No. 2 - Contaminated Soil**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-20 F02K1/MF00PJ | Undeveloped section of land on Sassy's Pit Stop property off west side of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 1, Roll 1, Photo 1, Ref. 14, p. 2; Ref. 18, p. 2 |
| SO-21 F02K2/MF00PK | Undeveloped section of land on the east side of FM 2725 and north of Garrett Road | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 19, Roll 2, Photo 5, Ref.14, p. 43; Ref. 18, p. 2 |

| Table 9<br>Background Sample Table for Source No. 2 - Contaminated Soil | | |
|---|---|---|
| **Hazardous Substance** | **Evidence** | |
| | **SO-20<br>F02K1/MF00PJ** | **SO-21<br>F02K2/MP00PK** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | |
| Fluoranthene | ND [330] | ND [350] |
| Pyrene | ND [330] | ND [350] |
| Benzo(a)anthracene | ND [330] | ND [350] |
| Chrysene | ND [330] | ND [350] |
| Benzo(b) fluoranthene | ND [330] | ND [350] |
| Benzo(k) fluoranthene | ND [330] | ND [350] |
| Benzo(a)pyrene | ND [330] | ND [350] |
| Indeno(1,2,3-cd)pyrene | ND [330] | ND [350] |
| Benzo(g,h,i)perylene | ND [330] | ND [350] |
| Analytical Reference | Ref. 19, pp. 17, 18, 29, 150-52 | Ref. 21, pp. 13, 20, 79-81 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.

[ ] = Sample Quantitation Limit.

J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Organics: ND=Not detected at the reported sample quantitation limit [SQL]

### 2.2.3 Hazardous Substances Available to a Pathway

Because the containment factor value for Source 2 is greater than 0, the following hazardous substances associated with Source 2 are available to migrate via the surface water pathway:

| | | |
|---|---|---|
| Fluoranthene | Chrysene | Benzo(a)pyrene |
| Pyrene | Benzo(b)fluoranthene | Indeno(1,2,3-cd)pyrene |
| Benzo(a)anthracene | Benzo(k)fluoranthene | Benzo(g,h,i)perylene |

Samples collected from Redfish Bay and HRS-qualifying wetlands indicate that hazardous substances have already migrated to the surface water pathway (See Section 4.1.2.1).

## 2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to Likelihood of Release to the Surface Water Pathway.

## 2.4 WASTE CHARACTERISTICS

### 2.4.1 Selection of Substance Potentially Posing Greatest Threat

The hazardous substance benzo(a)anthracene is the substance associated with this source posing the greatest hazard, because it has the highest combined toxicity/persistence/bioaccumulation value, has been found meeting the observed release criteria for the Surface Water Pathway, and is present in a source with a containment value greater than zero.

Specific factors of the hazardous substances available to the Surface Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (ecosystem toxicity, persistence, and bioaccumulation), are presented under the Surface Water Migration Pathway section of this Documentation Record.

## 2.4.2. Hazardous Waste Quantity

### 2.4.2.1 Source Hazardous Waste Quantity

#### 2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

#### 2.4.2.1.2. Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

#### 2.4.2.1.3. Volume (Tier C) - NE

The information available is not sufficient to evaluate the volume under Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.3).

#### 2.4.2.1.4. Area (Tier D)

For the migration pathways, the source is assigned a value for area using the appropriate Tier D equation from Table 2-5 (Ref. 1, Section 2.4.2.1.4). Since the contaminated soil volume could not be adequately evaluated under Tier C, the contaminated soil area will be evaluated under Tier D.

Since only one sample taken at this location, the actual area cannot be determined. The assigned source hazardous waste quantity value is unknown, but greater than 0.

### 2.4.2.1.5. Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, pp. Section 2.4.2.1).

**SOURCE NO. 2 - CONTAMINATED SOIL**
**SOURCE HAZARDOUS WASTE QUANTITY**

**TABLE 10**

| Tier Measure | Migration Pathway (Surface Water) |
|---|---|
| Tier A, Constituent Quantity | NE |
| Tier B, Wastestream Quantity | NE |
| Tier C, Volume | NE |
| Tier D, Area | >0 |

NE = Not Evaluated

**Source No. 2, Contaminated Soil, Hazardous Waste Quantity Value: > 0**

## 2.2.1 Source Identification

Number of the source: 3

Name and description of the source: Tanks (Associated with the Main Facility)

The main facility is the location of the process area including a tank farm, stabilizer, coalescer and salt towers, compressors, cooling towers, crude towers, desalter, butane tanks, heaters, boilers, laboratory, and an office (Ref. 38, p. 33).

Tank Inspections

The EPA CID of the Houston Area Office conducted a criminal investigation from January 1996 until August 2000 on the activities at Gulf Conservation Corporation (GCC), a facility located north of the dock facility, and MJP Resources, Inc. who were operating the NORCO facility (Ref. 27, p. 1). Specifically, the investigation was over a vinyl acetate slop stream delivered to GCC. According to Mr. Ronald Cady, Louisiana Department of Environmental Quality Regional Hazardous Waste Coordinator, and Mr. Brian Lynch, CID, the waste stream consisted of odorless mineral spirits (OMS) used as a carrier for a reactant in the production of polyethylene at Westlake Polymers in Sulphur, Louisiana. During the production, the mineral spirits are recycled until they become too contaminated to use and would be classed as a spent solvent (Ref. 28, p. 1). According to Mr. Mike Ward, GCC owner Mr. Jimmy Dupnik stored material from GCC in at least one tank on the NORCO facility (Ref. 29, p. 3).

Samples were collected by the CID in February 1996 from the two tanks (N1 and N2 also referred to as 32 and 33) in the main processing area of the NORCO facility (Figure Ref. 30, pp. 3, 4, 5, 9). The liquid samples collected revealed high concentrations of vinyl acetate in two tanks; 1,360,000 ug/L and 36,600,000 ug/L (Ref. 30, pp. 2-9). The case was declined to be prosecuted by the United State Attorney office, Southern District, Texas (Ref. 27, p. 1).

On February 16 and 19, 1996, an inspection was conducted by the TNRCC Region 14 staff at the NORCO facility in response to an alleged pipeline spill at the main facility on November 15, 1995 (Ref. 25, pp 1-3). Access was granted by Mr. Michael R. Ward, President of MJP Resources, leasing the NORCO facility. According to Craig Santana with Alamo Petroleum Exchange (APE), Mr. Ward hired APE to clean up the November 15, 1995 MJP Dock pipeline spill and he placed the liquids cleaned up from the spill in two tanks at NORCO (Ref. 27, p. 1; Ref. 37, p. 2). Analysis of the spilled material reported on November 15, 1995 revealed constituents not naturally occurring in crude oil (Ref. 25, p. 1; Ref. 34, p. 1). Mercury, lead, 1,2, dichloroethane, benzene, ethyl benzene, styrene, toluene, total xylenes, chrysene, m-creosol, o-creosol, p-creosol, fluorene, methyl isobutyl ketone, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, methyl t-butyl ether, total organic halogens, and vinyl acetate were detected in the samples collected (Ref. 26, pp. 15-54; Ref. 31, pp. 7-26; Ref. 32, pp. 4-13). Vinyl acetate was detected in tanks N1 and N2 (Ref. 31, pp. 3, 4, 15, 19).

Samples Collected

Samples collected during the May 2000 sampling event were not analyzed for vinyl acetate (Ref. 33, p. 16). Organic data were not usable for (F02JF/MF00P0), SO-04 (F02JH/MF00P2), SO-09 (F02JN/MF00P7), and SO-13 (F02JS/MF00PB).

The soil samples that characterize the contents of the tanks in this area include: SO-02 (F02JF/MF00P0), SO-04 (F02JH/MF00P2), SO-09 (F02JN/MF00P7), SO-10 (F02JP/MF00P8), SO-11 (F02JQ/MF00P9), SO-12 (F02JR/MF00PA), SO-13 (F02JS/MF00PB), SO-14 (F02JT/MF00PC), SO-16 (F02JX/MF00PJ), SO-30 (F02KB/MF00PW), and SO-33 (F02KE/MF00PZ). Soil samples SO-02 (F02JF/MF00P0), SO-04 (F02JH/MF00P2), SO-12 (F02JR/MF00PA), and SO-13 (F02JS/MF00PB) were collected in the process area (Tables 11-12). Soil sample SO-09 (F02JN/MF00P7) was collected near a spent caustic tank in the main processing area (Ref. 14, p. 10, Figure 2; Tables 11-12). SO-10 (F02JP/MF00P8) and SO-11 (F02JQ/MF00P9) were located in drainage areas (Figure 2; Tables 11-12). SO-30 (F02KB/MF00PW) was collected in the drainage ditch between tanks 29 and 31 in a drainage ditch that leads out the wetlands (Figures 1c and 2; Tables 11-12). Soil sample SO-33 (F02KE/MF00PZ) was collected within the fire walls of tank 13 (Figure 2, Tables 11-12). The associated information on background soil samples are available in Tables 13-14.

**Location of the source, with reference to a map of the site:**
See Figure 2, Source Sample Location Map.

**Source type for HRS evaluation purposes:** Tanks (Associated with the Main Facility)

**Containment**

**Gas release to air:** The air migration pathway was not evaluated; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not evaluated; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water migration pathway was not evaluated; therefore, a release to ground water was not evaluated.

**Release via overland migration and/or flood:** Source 3 consists of tanks. There is no containment and no liner present to prevent the migration of hazardous substances. The contaminated soil associated with source 3 will be evaluated as "Tank and containers other than drums " with evidence of hazardous substance migration from source area. A Containment factor value of 10 is assigned to the source as specified in Table 4-2 of the HRS Rule (Ref. 1, Table 4-2).

## 2.2.2 Hazardous Substances Associated With A Source

**Table 11**
**Soil Source Samples for Source No. 3 - Tank Farm**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-02 F02JF/MF00P0 | Location of January 2000 leak | Grab Sample 0" - 6" | 5/18/00 | Ref. 13, p. 32, Roll 2, Photo 31; Ref. 14, p. 36; Ref. 18, p. 2 |
| SO-04 F02JH/MF00P2 (Duplicate of SO-02) | Location of January 2000 leak | Grab Sample 0" - 6" | 5/18/00 | Ref. 13, p. 32, Roll 2, Photo 31; Ref. 14, p. 38; Ref. 18, p. 2 |
| SO-09 F02JN/MF00P7 | Located in the main process area | Grab Sample 0" - 6" | 5/18/00 | Ref. 13, p. 30, Roll 2, Photo 28; Ref. 14, p. 34; Ref. 18, p. 2 |
| SO-10 F02JP/MF00P8 | Possible area of oil in ditch | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 23, Roll 2, Photo 11; Ref. 14, p. 28; Ref. 18, p. 2 |
| SO-11 F02JQ/MF00P9 | Possible location of oil in ditch, leaking drum, and leaking cooling tower | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 23, Roll 2, Photo 12; Ref. 14, p. 29; Ref. 18, p. 2 |
| SO-12 F02JR/MF00PA | Possible spill around Tanks 17 and 21 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 22, Roll 2, Photo 13; Ref. 14, p. 30 Ref. 18, p. 2 |
| SO-13 F02JS/MF00PB | Possible location of spill | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 31, Roll 2, Photo 29; Ref. 14, p. 35; Ref. 18, p. 2 |
| SO-14 F02JT/MF00PC | Possible location of pipeline spill | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 22, Roll 2, Photo 14; Ref. 14, p. 24; Ref. 18, p. 2 |
| SO-16 F02JX/MF00PE | Located on the north side of Tank 28 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 16, Roll 1, Photo 31; Ref. 14, p. 26; Ref. 18, p. 2 |
| SO-17 F02JY/M00PF | Southeast side of Tank 30 | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 27, Roll 2, Photo 21; Ref. 14, p. 47, p. 47; Ref. 18, p.2 |
| SO-30 F02KB/MF00PW | Located in drainage pathway between Tank 29 and 31, slightly west of tanks | Grab Sample 0" - 6" | 5/17/00 | Ref. 13, p. 28, Roll 2, Photo 23, Ref. 14, p. 52; Ref. 18, p. 2 |
| SO-33 F02KE/MF00PZ | Location of historical discharge, within the fire walls of tank 13 | Grab Sample 0" - 10" | 5/17/00 | Ref. 13, p. 24, Roll 2, Photo 15; Ref. 14, p. 31; Ref. 18, p. 2 |

**Table 12**
**Source Characterization Table for Source No. 3 - Tank Farm**

| Hazardous Substances | Evidence | | | |
|---|---|---|---|---|
| | **SO-02 F02JF/MF00P0** | **SO-04 F02JH/MF00P2 (Duplicate of SO-02)** | **SO-09 F02JN/MF00P7** | **SO-10 F02JP/MF00P8** |
| **Semivolatile Organics Concentrations in ug/Kg [SQL]** | | | | |
| Chrysene | Not available | Not available | Not available | ND [370] |
| **Inorganics Concentrations in mg/Kg [SQL)]** | | | | |
| Aluminum | 448 [43.5] | 461 [ 43.2] | 645 [45.0] | **2150 [45.1]** |
| Arsenic | ND [2.2] | ND [2.2] | ND [2.3] | 0.81LJv [2.3] |
| Barium | 31.0 L [43.5] | 28.7L [43.2] | 35.2 L [45.0] | **176 [45.1]** |
| Chromium | 1.7L [2.2] | 1.6 L [2.2] | 1.7 L [2.3] | **2.8 [2.3]** |
| Copper | 1.4 LJv [5.4] | 1.3 L [5.4] | 1.7 L [5.6] | 2.4L [5.6] |
| Lead | **204 [0.65]** | **185 [0.65]** | **89.5 [0.67]** | 11.3 [0.68] |
| Manganese | 17.1 [3.3] | 15.9 [3.2] | **26.7 [3.4]** | **124 [3.4]** |
| Mercury | 0.064L [0.11] | 0.058L [0.11] | 0.054L [0.11] | ND [0.11] |
| Nickel | 0.33 LJv [8.7] | 0.16 LJv [8.7] | 0.24 LJv [9.0] | 1.8L [9.0] |
| Thallium | ND [2.2] | ND [2.2] | ND [2.3] | ND [2.3] |
| Vanadium | 0.88L [10.9] | 0.88L [10.8] | 1.3L [11.3] | 5.5L [11.3] |
| Zinc | **165 [4.4]** | **156 [4.3]** | 19.2 [4.5] | 12.7 [4.5] |
| **Analytical Reference** | Ref. 17, pp. 10, 16, 23 | Ref. 17, pp. 11, 16, 25 | Ref. 17, pp. 11, 16, 28 | Ref. 15, pp. 14, 15, 27, 97; Ref. 17, pp. 11, 18, 29 |

General : Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Inorganics: ND=Not detected at the laboratory reported detection limit (IDL).
L = Reported concentration is between the IDL and the CRDL.
v = Low biased. Actual concentration may be higher than the concentration reported.

| Table 12 (continued)<br>Source Characterization Table for Source No. 3 - Tank Farm | | | | |
|---|---|---|---|---|
| **Hazardous Substances** | **Evidence** | | | |
| | **SO-11<br>F02JQ/MF00P9** | **SO-12<br>F02JR/MF00PA** | **SO-13<br>F02JS/MF00PB** | **SO-14<br>F02JT/MF00PC** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | | | |
| Chrysene | 47LJ [390] | ND [3500] | Not available | ND [370] |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL)]** | | | | |
| Aluminum | **6050 [49.3]** | 1630 [42.8] | 796 [50.7] | 2470 [44.9] |
| Arsenic | 1.0 LJv [2.5] | **2.6 Jv [2.1]** | ND [2.5] | 0.86 LJv [2.2] |
| Barium | 129 [1.2] | **1040 [42.8]** | 47.0L [50.7] | 68.7 [44.9] |
| Chromium | **8.5 [2.5]** | **23.2 [2.1]** | 2.2L [2.5] | 2.8 [2.2] |
| Copper | 5.8L [6.2] | **49.7 [5.4]** | 3.8L [6.3] | 1.9L [5.6] |
| Lead | **60.4 [0.74]** | **200 [0.64]** | **220 [0.76]** | **28.6 [0.67]** |
| Manganese | **145 [3.7]** | 59.5 [3.2] | 43.4 [3.8] | 101 [3.4] |
| Mercury | 0.072L [0.12] | **0.18 [0.11]** | 0.080L[0.13] | ND [0.11] |
| Nickel | 3.5L [9.9] | 7.9L [8.6] | 0.72 LJv [10.1] | 1.6 LJv [9.0] |
| Thallium | ND [2.5] | 0.74L [2.1] | ND [2.5] | ND [2.2] |
| Vanadium | 9.0L [12.3] | **15.7 [10.7]** | 2.1L [12.7] | 4.8 L [11.2] |
| Zinc | **99.5 [4.9]** | **291[4.3]** | **156[5.1]** | 13.6 [4.5] |
| **Analytical Reference** | Ref. 15, pp. 14, 15, 28, 100; Ref. 17, pp. | Ref. 15, pp. 14, 15, 28, 103; Ref. 17, pp. | Ref. 17, pp. 9, 16, 32 | Ref. 15, pp. 14, 15, 28, 106; Ref. 17, pp. |

General : Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.
Inorganics: ND=Not detected at the laboratory reported detection limit (IDL).
L = Reported concentration is between the IDL and the CRDL.
v = Low biased. Actual concentration may be higher than the concentration reported.

| Table 12 (continued)<br>Source Characterization Table for Source No. 3 - Tanks | | | | |
|---|---|---|---|---|
| **Hazardous Substances** | **Evidence** | | | |
| | **SO-16<br>F02JX/MF00PE** | **SO-17<br>F02JY/M00PF** | **SO-30<br>F02KB/MF00PW** | **SO-33<br>F02KE/MF00PZ** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | | | |
| Chrysene | ND [420] | ND [390] | ND [520] | **2500 [1900]** |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL)]** | | | | |
| Aluminum | 1810 [50.8] | 3610 [47.5] | **5060 [61.4]** | 1120 [45.7] |
| Arsenic | **4.9 Jv [2.5]** | 1.5 LJv [2.4] | 1.8L [3.1] | **5.6 [2.3]** |
| Barium | 149 [50.8] | 138 [47.5] | 136 [61.4] | 47.2 [45.7] |
| Chromium | **31.5 [2.5]** | 4.6 [2.4] | 5.0 [3.1] | **28.6 [2.3]** |
| Copper | **30 .6 [6.4]** | 5.2L [5.9] | 5 L [7.7] | **50.2 [5.7]** |
| Lead | **124 [0.76]** | **18.6 [0.71]** | 9.2 [0.92] | **31.3 [0.68]** |
| Manganese | **735 [3.8]** | **185 [3.6]** | **222 [4.6]** | **139 [3.4]** |
| Mercury | 0.096L [0.13] | 0.065L [0.12] | 0.07LUC [0.15] | 0.06LUC [0.11] |
| Nickel | **42.7 [10.2]** | 2.8L [9.5] | 3.7L [12.3] | **14.1 [9.1]** |
| Thallium | **5.9 [2.5]** | ND [2.4] | ND [3.1] | **8.8 [2.3]** |
| Vanadium | 6.5L [12.7] | 7.0L [11.9] | 8.6L [15.3] | 5.6L [11.4] |
| Zinc | **44.4 [5.1]** | **38.2 [4.7]** | **42.8 [6.1]** | **43.9 [4.6]** |
| **Analytical Reference** | Ref. 15, pp. 14, 15, 27, 112; Ref. 17, pp. 10, 18, 35 | Ref. 15, p. 14, 15, 28, 115; Ref. 17, pp. 10, 36 | Ref. 15, pp. 16, 17, 27, 139; Ref. 16, pp. 11, 19, 36 | Ref. 15, pp. 16, 17, 27, 145; Ref. 16, pp. 11, 20, 38 |

General : Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Inorganics: ND=Not detected at the laboratory reported detection limit (IDL).
L = Reported concentration is between the IDL and the CRDL.
v = Low biased. Actual concentration may be higher than the concentration reported.

**Table 13**
**Background Sample Locations for Source No. 3 - Tanks**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| **For Soil Sample: SO-13** | | | | |
| SO-01 F02JE/MF00NZ | Located on north side of Sunray Road on the eastside of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 5, Roll 1, Photo 9, Ref. 14, pp. 6-7; Ref. 18, p. 2 |
| SO-32 F02KD/MF00PY Dup of SO-01 | Located on north side of Sunray Road on the eastside of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 5, Roll 1, Photo 9, Ref. 14, pp. 6-7; Ref. 18, p. 2 |
| **For Soil Sample: SO-12** | | | | |
| SO-20 F02K1/MF00PJ | Undeveloped section of land on Sassy's Pit Stop property off west side of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 1, Roll 1, Photo 1, Ref. 14, p. 2; Ref. 18, p. 2 |
| SO-21 F02K2/MF00PK | Undeveloped section of land on the east side of FM 2725 and north of Garrett Road | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 19, Roll 2, Photo 5, Ref.14, p. 43; Ref. 18, p. 2 |

| Table 14<br>Background Sample Table for Source No. 3 - Tanks | | | | |
|---|---|---|---|---|
| **Hazardous Substance** | **Evidence** | | | |
| | **SO-01<br>F02JE/MF00NZ** | **SO-20<br>F02K1/MF00PJ** | **SO-21<br>F02K2/MF00PK** | **SO-32<br>F02KD/MF00PY<br>Dup of SO-01** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | | | |
| Chrysene | ND [350] | ND [330] | ND [350] | ND [330] |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL)]** | | | | |
| Aluminum | 561 [42.51] | 372 [41.84] | 1360 [42.37] | 519 [42.28] |
| Arsenic | ND [2.13] | ND [2.09] | 1.9 LUC [2.12] | ND [2.11] |
| Barium | 44.9 [42.51] | 32.9 L [41.84] | 95.6 [42.37] | 38.9L [42.28] |
| Chromium | 0.86 LUCJ^ [2.13] | 0.74 LJ^ [2.09] | 2.1 L [2.12] | 0.71 LJ^ [2.11] |
| Copper | 1.2 LJ^ [5.31] | 1.1 LJ^ [5.23] | 1.7 L [5.30] | 1.1 LJ^ [5.29] |
| Analytical Reference | Ref. 19, pp. 17, 18, 30, 48; Ref. 20, pp. 10, 16, 35 | Ref. 19, pp. 17, 18, 29, 150-52; Ref. 20, pp. 11, 17, 36 | Ref. 21, pp. 13, 20, 79-81; Ref. 16, pp. 9, 16, 27 | Ref. 19, pp. 17, 18, 29, 54; Ref. 20, pp. 11, 16, 37 |

| Table 14 (continued)<br>Background Sample Table for Source No. 3 - Tanks | | | | |
|---|---|---|---|---|
| **Hazardous Substance** | **Evidence** | | | |
| | **SO-01<br>F02JE/MF00NZ** | **SO-20<br>F02K1/MF00PJ** | **SO-21<br>F02K2/MF00PK** | **SO-32<br>F02KD/MF00PY<br>Dup of SO-01** |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL)]** | | | | |
| Lead | 5.6 [0.64] | 3.5 [0.63] | 4.4 [0.64] | 5.0 [0.63] |
| Manganese | 22.3 J^ [3.19] | 21.0 J^ [3.14] | 42.8 [3.18] | 20.1 J^ [3.17] |
| Mercury | 0.059 LUC [0.11] | ND [0.10] | 0.048 LUC [0.11] | 0.065 LUC [0.11] |
| Nickel | 0.27 LJv [8.50] | ND [8.37] | 1.9 L [8.47] | ND [8.46] |
| Thallium | ND [2.13] | ND [2.09] | ND [2.12] | ND [2.11] |
| Vanadium | 0.84 L [10.63] | 0.48 L [10.46] | 5.1 L [10.59] | 0.70 L [10.57] |
| Zinc | 32.7 J^ [4.25] | 9.0 J^ [4.18] | 7.5 [4.24] | 27.7 J^ [1.06] |
| Analytical Reference | Ref. 20, pp. 10, 16, 35 | Ref. 20, pp. 11, 17, 36 | Ref. 16, pp. 9, 16, 27 | Ref. 20, pp. 10, 16, 35 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit; [ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Inorganics: ND = Not detected at the laboratory reported detection limit (IDL).
^ = Estimated concentration may be lower than the concentration reported.
L = Reported concentration is between the IDL and the CRDL.
UC = Reported concentration should be used as a raised detection limit because of apparent blank contamination.

### 2.2.3 Hazardous Substances Available to a Pathway

In addition to the hazardous substances detected in soil samples collected in May 2000 near the tanks in the main facility, analysis of the spilled liquids cleaned up from the November 15, 1995 MJP Dock pipeline spill (which were placed in two tanks at the facility) revealed the presence of the following hazardous constituents: mercury, lead, 1,2-dichloroethane, benzene, ethyl benzene, styrene, toluene, total xylenes, chrysene, m-creosol, o-creosol, p-creosol, methyl isobutyl ketone, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, methyl t-butyl ether, and vinyl acetate in the samples collected (Ref. 26, pp. 15-54; Ref. 27, p. 1; Ref. 31, pp. 7-26; Ref. 32, pp. 4-13; Ref. 37, p. 2).

Because the containment factor value for Source 3 is greater than 0, the following hazardous substances associated with Source 3 are available to migrate via the surface water pathway:

| | | | |
|---|---|---|---|
| Benzene | Chrysene | Tetrachloroethene | Lead |
| 1,2 Dichloroethane | 2-Methylnaphthalene | Phenanthrene | Mercury |
| Ethylbenzene | Methyl t-butyl ether | Aluminum | Nickel |
| Styrene | m, o, p- creosol | Arsenic | Vanadium |
| Toluene | Methyl isobutyl ketone | Barium | Thallium |
| Total Xylenes | Naphthalene | Chromium | Zinc |
| Vinyl acetate | Pyrene | Copper | |

Samples collected from HRS-qualifying wetlands and Redfish Bay indicate that hazardous substances have already migrated to the surface water pathway (See Section 4.1.2.1).

## 2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to Likelihood of Release to the Surface Water Pathway.

## 2.4 WASTE CHARACTERISTICS

### 2.4.1 Selection of Substance Potentially Posing Greatest Threat

The hazardous substance mercury is the substance associated with this source posing the greatest hazard, because it has the highest combined toxicity/persistence/bioaccumulation value, has been

found meeting the observed release criteria for the Surface Water Pathway, and is present in a source with a containment value greater than zero.

Specific factors of the hazardous substances available to the Surface Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (ecosystem toxicity, persistence, and bioaccumulation), are presented under the Surface Water Migration Pathway section of this Documentation Record.

### 2.4.2. Hazardous Waste Quantity

### 2.4.2.1 Source Hazardous Waste Quantity

#### 2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

#### 2.4.2.1.2. Hazardous Wastestream Quantity (Tier B) - (NE)

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

#### 2.4.2.1.3. Volume (Tier C)

The information available is sufficient to evaluate the volume under Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. Tier C for tanks and containers other that drums is calculated with the formula V/2.5 where V is in units of cubic yards ($yd^3$).

| Table 15<br>Tank Volumes | | | | | |
|---|---|---|---|---|---|
| **Tank No.** | **Capacity (BBL)** | **Diameter (ft)** | **Height (ft)** | **Volume (gal) #gallons = #barrels x 42gal/bbl** | **Volume ($yd^3$) $yd^3$ = 0.004951$yd^3$/gal x # gallons** |
| 12 | 100,000 | 122 | 48 | 4,200,000 | 20,794.2 |
| 13 | 100,000 | 122 | 48 | 4,200,000 | 20,794.2 |
| 14 | 100,000 | 100 | 40 | 4,200,000 | 20,794.2 |
| 15 | 55,000 | 100 | 40 | 2,310,000 | 11,436.81 |
| 16 | 55,000 | 34 | 32 | 2,310,000 | 11,436.81 |
| 17 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 18 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 19 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 20 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 21 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 22 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 23 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 24 | 5,000 | 34 | 32 | 210,000 | 1,039.71 |
| 25 | 15,000 | 52 | | 630,000 | 3,119.13 |
| 28 | 67,000 | 109 | 40 | 2,814,000 | 13,932.11 |
| 29 | 67,000 | 109 | 40 | 2,814,000 | 13,932.11 |
| 31 | 100,000 | 125 | 48 | 4,200,000 | 20,794.2 |
| 32 (N1) | 20,000 | | | 840,000 | 4,158.84 |
| 33 (N2) | 20,000 | | | 840,000 | 4,158.84 |
| Reference | Ref. 38, p. 33 | | | | |

Total tank volume = 153,669.13 $yd^3$

V/2.5 = 153,669.13 $yd^3$ /2.5 = 61,467.65

**2.4.2.1.4. Area (Tier D)** - (NE)

Since the volume of the tanks was adequately evaluated under Tier C, the contaminated soil area will not be evaluated under Tier D (Ref. 1, Section 2.4.2.1.4).

**2.4.2.1.5. Source Hazardous Waste Quantity Value**

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, pp. Section 2.4.2).

**SOURCE NO. 3 -TANKS**
**SOURCE HAZARDOUS WASTE QUANTITY**

**TABLE 16**

| Tier Measure | Migration Pathway (Surface Water) |
|---|---|
| Tier A, Constituent Quantity | NE |
| Tier B, Wastestream Quantity | NE |
| Tier C, Volume | >0 |
| Tier D, Area | NE |

NE = Not Evaluated

Although the hazardous waste quantity value for Source 3 has been calculated to be 61,467.65, since the nature of the materials contained in each of these tanks is not documented, the hazardous waste quantity for Source 3 will be assigned as greater than 0.

**Source No. 3, Tanks, Hazardous Waste Quantity Value: > 0**

### 2.2.1 Source Identification

Number of the source: 4

Name and description of the source: Land Treatment

In a Notification of Hazardous Waste Activity, signed on October 20, 1980 by Mr. Eugene W. Hodge, Vice President of UNI Refining, Inc., four hazardous waste from specific sources were listed: K048, K049, K050, and K051 (Ref. 7, pp. 1-2; Ref. 41, p. 11). Of these sources, the listed hazardous waste K051, API separator sludge from the petroleum refining industry based on the toxicity of the sludge (Ref. 8, p. 47), was documented in an inspection report to have been deposited inside the walls of a tank berm (Ref. 40, p. 8).

In 1980, approximately three cubic yards of API separator sludges were spread onto the ground (Ref. 39, p. 3). The sludges were disposed of by UNI Refining, Inc., within the fire walls of Tank 30, which measured approximately 200 feet by 200 feet. The disposal area was designated as an earthen, above-grade, unlined basin in the facility's permit application (Ref. 41, pp. 11, 13).

Samples SO-31 (F02KC/MF00PX) and SO-34 (F02KF/MF00Q0) were taken within the land treatment basin where a visual inspection revealed a dark substance in the soil (Tables 16-17; Ref. 13, p. 26, Roll 2, Photos 19 and 20). The associated information on background soil samples is available in Tables 18-19.

**Location of the source, with reference to a map of the site:**
See Figure 2, Source Sample Location Map.

**Source type for HRS evaluation purposes:** Land Treatment

**Containment**

**Gas release to air:** The air migration pathway was not evaluated; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not evaluated; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water migration pathway was not evaluated; therefore, a release to ground water was not evaluated.

**Release via overland migration and/or flood:** Source 4 consists of land treatment. There is no containment and no liner present to prevent the migration of hazardous substances (Ref. 13, p. 26, Photo 19). Source 4 will be evaluated as "Land Treatment" with evidence of hazardous substance migration from the land treatment zone. Based on the lack of a functioning and maintained run-on control and runoff management system, a Containment factor value of 10 is assigned to the source as specified in Table 4-2 of the HRS Rule (Ref. 1, Table 4-2).

### 2.2.2 Hazardous Substances Associated With A Source

**Table 17**
**Source Sample Locations for Source No. 4 - Land Treatment**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-31 F02KC/MF00PX | Located northeast side of tank 30 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 26, Roll 2, Photo 19; Ref. 14, p. 53; Ref. 18, p. 2 |
| SO-34 F02KF/MF00Q0 (Duplicate of SO-31) | Located northeast side of tank 30 | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 26, Roll 2, Photo 19; Ref. 14, p. 54; Ref. 18, p. 2 |

**Table 18**
**Source Characterization Table for Source No. 4 - Land Treatment**

| Hazardous Substances | Evidence | |
|---|---|---|
| | **SO-31 F02KC/MF00PX** | **SO-34 F02KF/MF00Q0 (Duplicate of SO-31)** |
| **Inorganics Concentrations in mg/Kg [SQL]** | | |
| Lead | **19 [0.63]** | **25.1 [0.63]** |
| Zinc | **40.3 [4.2]** | **40.9 [4.2]** |
| **Analytical Reference** | Ref. 16, pp. 11, 19,37 | Ref. 16, pp. 11, 19, 39 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.

**Table 19**
**Background Sample Locations for Source No. 4 - Land Treatment**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-20 F02K1/MF00PJ | Undeveloped section of land on Sassy's Pit Stop property off west side of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 1, Roll 1, Photo 1, Ref. 14, p. 2; Ref. 18, p. 2 |
| SO-21 F02K2/MF00PK | Undeveloped section of land on the east side of FM 2725 and north of Garrett Road | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 19, Roll 2, Photo 5, Ref.14, p. 43; Ref. 18, p. 2 |

**Table 20**
**Background Sample Table for Source No. 4 - Land Treatment**

| Hazardous Substance | Evidence | |
|---|---|---|
| | **SO-20 F02K1/MF00PJ** | **SO-21 F02K2/MF00PK** |
| **Inorganics Concentrations in mg/Kg [SQL]** | | |
| Lead | 3.5 [0.63] | 4.4 [0.64] |
| Zinc | 9.0 J^ [4.18] | 7.5 [4.24] |
| Analytical Reference | Ref. 20, pp. 11, 17, 36 | Ref. 16, pp. 13, 16, 27 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.
Inorganics: ^ = Estimated concentration may be lower than the concentration reported.

### 2.2.3 Hazardous Substances Available to a Pathway

Because the containment factor value for Source 4 is greater than 0, the following hazardous substances associated with Source 4 are available to migrate via the surface water pathway:

Lead Zinc

## 2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to Likelihood of Release to the Surface Water Pathway.

## 2.4 WASTE CHARACTERISTICS

### 2.4.1 Selection of Substance Potentially Posing Greatest Threat

The hazardous substances lead is the substance associated with this source posing the greatest hazard, because it has the highest combined toxicity/persistence/bioaccumulation value and is present in a source with a containment value greater than zero.

Specific factors of the hazardous substances available to the Surface Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (ecosystem toxicity, persistence, and bioaccumulation), are presented under the Surface Water Migration Pathway section of this Documentation Record.

## 2.4.2. Hazardous Waste Quantity

### 2.4.2.1 Source Hazardous Waste Quantity

#### 2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

#### 2.4.2.1.2. Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

#### 2.4.2.1.3. Volume (Tier C)

The information available is not sufficient to evaluate the volume under Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.3).

#### 2.4.2.1.4. Area (Tier D) - NE

For the migration pathways, the source is assigned a value for area using the appropriate Tier D equation from Table 2-5 (Ref. 1, Section 2.4.2.1.4). Since the land treatment could not be adequately evaluated under Tier C, the land treatment area will be evaluated under Tier D.

Tier D for Land Treatment is calculated with the formula, A/270, where A is in square feet (ft2) (Ref. 1, Section 2.4.2.1.4).

The source is within the bermed area of Tank 30 which measures approximately 200 by 200 feet (Ref. 9, p. 10).

Area of tank berms = 200 ft x 200 ft = 40,000 $ft^2$

area of tank = $\pi r^2$ = $\pi$ x $(62.5)^2$ (Ref. 38, p. 33) = 12,271.85

A/270 = 27,728.15/270 = 102.70

### 2.4.2.1.5. Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, Section 2.4.2).

**SOURCE NO. 4- LAND TREATMENT**
**SOURCE HAZARDOUS WASTE QUANTITY**

**TABLE 21**

| Tier Measure | Migration Pathway (Surface Water) |
|---|---|
| Tier A, Constituent Quantity | NE |
| Tier B, Wastestream Quantity | NE |
| Tier C, Volume | NE |
| Tier D, Area | 102.70 |

NE = Not Evaluated

**Source No. 4, Land Treatment, Hazardous Waste Quantity Value: 102.70**

## 2.2 SOURCE CHARACTERIZATION

### 2.2.1 Source Identification

Number of the source: 5

Name and description of the source: Pile

On March 12, 1986, an inspection conducted by the Texas Water Commission revealed that the Falcon Refinery had disposed of cooling tower sludges onsite. These sludges were sampled and revealed Total Chromium of 8020 mg/kg and EP Tox Chromium of 46 ug/kg (Ref. 9, p. 11). As stated in the inspection report, "When asked about the generation and disposition of cooling tower sludge, the refinery manager stated the cooling tower basin had been cleaned out and that sludge was 'dumped on the ground'"(Ref. 13, p. 18). The approximate location of the sludges were determined by a 1986 inspection report and by visual observation (Ref.9, p. 10; Ref. 13, p. 29, Roll 2, Photo 25). Sample SO-28 (F02K9/MF00PS) was taken at this location (Tables 21-22; Ref. 14, pp. 50-51). The associated information on background soil samples are available in Tables 23-24. Chromium is a hazardous substance according to 40 CFR 261 (Ref. 8, p. 13).

**Location of the source, with reference to a map of the site:**
See Figure 2, Source Sample Location Map.

**Source type for HRS evaluation purposes:** Pile

**Containment**

**Gas release to air:** The air migration pathway was not evaluated; therefore, gas containment was not evaluated.

**Particulate release to air:** The air migration pathway was not evaluated; therefore, particulate containment was not evaluated.

**Release to ground water:** The ground water migration pathway was not evaluated; therefore, a release to ground water was not evaluated.

**Release via overland migration and/or flood:** Source 5 consists of a pile. There is no containment and no liner present to prevent the migration of hazardous substances (Ref. 13, p. 29, Roll 2, Photo 25). Source 5 will be evaluated as "Pile" with evidence of hazardous substance migration from source area. Based on the lack of a maintained engineered cover or a functioning run-on control system and runoff management system, a Containment factor value of 10 is assigned to the source as specified in Table 4-2 of the HRS Rule (Ref. 1, Table 4-2).

## 2.2.2 Hazardous Substances Associated With A Source

| Table 22<br>Sample Locations for Source No. 5 - Pile | | | | |
|---|---|---|---|---|
| **Station/ CLP ID. No.** | **Sample Location** | **Sample Depth** | **Date Collected** | **Reference** |
| SO-28<br>F02K9/MF00PS | Located in a mound southwest of Tank #30 and Tank #31 | Grab Sample<br>0" - 6" | 5/17/00 | Ref. 13, p. 29, Roll 2, Photo 25, Ref. 14, p. 51; Ref. 18, p. 2 |

| Table 23<br>Source Characterization Table for Source No. 5 - Pile | |
|---|---|
| **Hazardous Substances** | **Evidence** |
| | **SO-28<br>F02K9/MF00PS** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | |
| Pyrene | **3900 [3900]** |
| Chrysene | **8500 [3900]** |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL]** | |
| Aluminum | **4610 [54.1]** |
| Arsenic | **23.3 [2.7]** |
| Cadmium | **1.3 [1.4]** |
| Chromium | **67.5 [2.7]** |
| Copper | **75.6 [6.8]** |
| Lead | **30.5 [0.81]** |
| Manganese | **434 [4.1]** |
| Nickel | **49.7 [10.8]** |
| Selenium | **2.5 [1.4]** |
| Thallium | **10.5 [2.7]** |
| Vanadium | **14.5 [13.5]** |
| Zinc | **81.1 [5.4]** |
| Analytical Reference | Ref. 42, pp. 18, 19, 31, 116; Ref. 16, pp. 10, 18, 34 |

**Table 24**
**Background Sample Locations for Source No. 5 - Pile**

| Station/ CLP ID. No. | Sample Location | Sample Depth | Date Collected | Reference |
|---|---|---|---|---|
| SO-20 F02K1/MF00PJ | Undeveloped section of land on Sassy's Pit Stop property off west side of FM 2725 | Grab Sample 0" - 6" | 5/15/00 | Ref. 13, p. 1, Roll 1, Photo 1, Ref. 14, p. 2; Ref. 18, p. 2 |
| SO-21 F02K2/MF00PK | Undeveloped section of land on the east side of FM 2725 and north of Garrett Road | Grab Sample 0" - 6" | 5/16/00 | Ref. 13, p. 19, Roll 2, Photo 5, Ref.14, p. 43; Ref. 18, p. 2 |

| Table 25<br>Background Sample Table for Source No. 5 - Pile | | |
|---|---|---|
| **Hazardous Substance** | **Evidence** | |
| | **SO-20<br>F02K1/MF00PJ** | **SO-21<br>F02K2/MF00PK** |
| **Semivolatile Organics<br>Concentrations in ug/Kg<br>[SQL]** | | |
| Pyrene | ND [330] | ND [350] |
| Chrysene | ND [330] | ND [350] |
| **Inorganics<br>Concentrations in mg/Kg<br>[SQL]** | | |
| Aluminum | 372 [41.84] | 1360 [42.37] |
| Arsenic | ND [0.46] | 1.9 LUC [2.12] |
| Barium | 32.9 L [41.84] | 95.6 [42.37] |
| Cadmium | ND [1.05] | ND [1.06] |
| Chromium | 0.74 LJ^ [2.09] | 2.1 L [2.12] |
| Copper | 1.1 LJ^ [5.23] | 1.7L [5.30] |
| Lead | 3.5 [0.63] | 4.4 [0.64] |
| Manganese | 21.0 J^ [3.14] | 42.8 [3.18] |
| Nickel | ND [8.37] | 1.9 L [8.47] |
| Selenium | 0.57 L [1.05] | ND [1.06] |
| Thallium | ND [2.09] | ND [2.12] |
| Vanadium | 0.48 L [10.46] | 5.1 L [10.59] |
| Zinc | 9.0 J^ [4.18] | 7.5 [4.24] |
| **Analytical Reference** | Ref. 19, pp. 17, 18, 29, 150-52; Ref. 20, pp. 11, 17, 36 | Ref. 21, pp. 13, 14, 20, 79-81; Ref. 16, pp. 9, 16, 27 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Inorganics: ND=Not detected at the laboratory reported detection limit (IDL).
L = Reported Concentration is between the IDL and the CRDL
^ = High biased. Estimated concentration.

### 2.2.3 Hazardous Substances Available to a Pathway

Because the containment factor value for Source 5 is greater than 0, the following hazardous substances associated with Source 5 are available to migrate via the surface water pathway:

| | | | | |
|---|---|---|---|---|
| Pyrene | Arsenic | Copper | Nickel | Vanadium |
| Chrysene | Cadmium | Lead | Selenium | Zinc |
| Aluminum | Chromium | Manganese | Thallium | |

Samples collected from HRS-qualifying wetlands and Redfish Bay indicate that hazardous substances have already migrated to the surface water pathway (See Section 4.1.2.1).

## 2.3 LIKELIHOOD OF RELEASE

Refer to Section 4.1.2.1 of this documentation record for specific information related to Likelihood of Release to the Surface Water Pathway.

## 2.4 WASTE CHARACTERISTICS

### 2.4.1 Selection of Substance Potentially Posing Greatest Threat

The hazardous substance pyrene is the substance associated with this source posing the greatest hazard, because it has the highest combined toxicity/persistence/bioaccumulation value, has been found meeting the observed release criteria for the Surface Water Pathway, and is present in a source with a containment value greater than zero.

Specific factors of the hazardous substances available to the Surface Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (toxicity, persistence, and bioaccumulation) are presented under the Surface Water Migration Pathway section of this Documentation Record.

## 2.4.2. Hazardous Waste Quantity

### 2.4.2.1 Source Hazardous Waste Quantity

#### 2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous wastestream quantity (Ref. 1, Section 2.4.2.1.1).

#### 2.4.2.1.2. Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

#### 2.4.2.1.3. Volume (Tier C) - NE

The information available is not sufficient to evaluate the volume under Tier C, as required in Section 2.4.2.1.3 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier D, area (Ref. 1, Section 2.4.2.1.3).

#### 2.4.2.1.4. Area (Tier D)

For the migration pathways, the source is assigned a value for area using the appropriate Tier D equation from Table 2-5 (Ref. 1, Section 2.4.2.1.4). Since the pile volume could not be adequately evaluated under Tier C, the pile area will be evaluated under Tier D.

Due to the fact that there was only one sample taken at this location, the actual area cannot be determined. The assigned source hazardous waste quantity value is unknown, but greater than 0.

### 2.4.2.1.5. Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, Section 2.4.).

**SOURCE NO. 5 - PILE**
**SOURCE HAZARDOUS WASTE QUANTITY**

**TABLE 26**

| Tier Measure | Migration Pathway (Surface Water) |
|---|---|
| Tier A, Constituent Quantity | NE |
| Tier B, Wastestream Quantity | NE |
| Tier C, Volume | NE |
| Tier D, Area | >0 |

NE = Not Evaluated

**Source No. 5, Pile, Hazardous Waste Quantity Value: > 0**

## SITE SUMMARY OF SOURCE DESCRIPTIONS

During the week of May 15 through 19, 2000, the Texas Natural Resource Conservation Commission (TNRCC), Superfund Site Discovery and Assessment Program (SSDAP) conducted sampling activities at the Falcon Refinery site. The purpose of this investigation was to document the release(s) or potential release(s) of hazardous substances from the site. Thirty-one source samples were collected from a depth of 0 to 6 inches at the site (see Figure 2, Source Sample Location Map; Ref. 14, pp 22-31, 33-39, 42, 47-56).

All of the source samples collected during this sampling event were analyzed for Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL) constituents following EPA CLP analytical methods (Ref. 33, pp. 16, 21). The analytical results documented organic and inorganic concentrations greater than or equal to the background sample(s) quantitation limit, if not detected in background (see Tables 1-26).

**Table 27**
**Site Summary of Source Descriptions**

| Source Number | Source Hazardous Waste Quantity Value | Containment | | | | |
|---|---|---|---|---|---|---|
| | | Ground Water | Surface Water | Soil Exposure | Gas | Air Particulate |
| 1 | 1.47 | NE | 10 | NE | NE | NE |
| 2 | >0 | NE | 10 | NE | NE | NE |
| 3 | >0 | NE | 10 | NE | NE | NE |
| 4 | 102.70 | NE | 10 | NE | NE | NE |
| 5 | >0 | NE | 10 | NE | NE | NE |
| **TOTAL** | **>102.70** | | | | | |

NE = Not Evaluated

According to Section 2.4.2.2. of the HRS Rule, if any target for the migration pathway is subject to Level I or Level II concentrations, assign either the value from HRS Table 2-6 or a hazardous waste quantity factor value of 100, whichever is greater. Since targets for the Surface Water Migration Pathway are subject to Level II concentrations, a value of 100 is assigned as the Hazardous Waste Quantity Factor Value (Ref. 1, Section 2.4.2.2).

**Source No. 1, Contaminated Soil, Hazardous Waste Quantity Value: 1.47**

**Source No. 2, Contaminated Soil, Hazardous Waste Quantity Value: > 0**

**Source No. 3, Tanks, Hazardous Waste Quantity Value: >0**

**Source No. 4, Land Treatment, Hazardous Waste Quantity Value: 102.70**

**Source No. 5, Pile, Hazardous Waste Quantity Value: > 0**

**Assigned Hazardous Waste Quantity Factor Value: 100**

## SOURCES NOT SCORED

- During the TNRCC May 2000 sampling event, stained soils and buried pieces of black plastic were identified (Ref. 13, p. 38, Roll 3, Photo 12). Sample SO-06 (F02JK/MF00P4) was taken at the location of the stained soils (Ref. 14, p. 56; Ref. 18, p. 2). There was insufficient data to score this as a source.

- At the northwest corner of FM 2725 and Bishop Road, there is a truck loading terminal that is a part of the Falcon Refinery (Ref. 35, pp. 49, 50). Pipelines extend from the main processing area to the storage tanks and then to the truck loading area. Sample SO-03 (F02JG/MF00P1) was taken under an elevated pipe. This pipe was located where the transfer of material between the storage tanks at the refinery and trucks may have occurred. The organic analytical results for soil sample SO-03 are unusable. This sample was received at the laboratory at an elevated cooler temperature of 22°C, which far exceeded the method-specified upper limit of 6°C, and was kept at the elevated temperature for an extended period of time. Further evaluation of this location may be necessary. There was insufficient data to score this as a source.

- A review of a 1979 aerial photograph revealed the location of a pond constructed by Uni Oil (Ref. 34, p. 1). The 200 feet x 200 feet impoundment lies in the northwestern quadrant of FM 2725 and Bishop Road. The pond was constructed to hold treated effluent under Permit 02142 (Ref. 45, pp. 1,2). There was insufficient data to score this as a source.

- An inspection by Texas Water Commission (TWC) staff in June 1986 revealed numerous drums in varying stages of disintegration, containing caustics, waste oils, and unidentified substances. Approximately 50 drums, in various stages of deterioration, were located around the refinery, thirty of which contained material. Four drums were tested with pH paper and exhibited a high pH (>11). There were 21 drums west of tank 31. There were numerous drums with bullet holes, and spilled material was noted around the drum area. Only four of these drums appeared to contain material. Two drums located in another area were full and labeled "acetone" (Ref. 13, p. 18). Samples SO-07 (F02JL/MF00P5) and SO-08 (F02JM/MF00P6) were collected in this area (Ref. 13, p. 31, Roll2, Photo 30; Ref. 14, p. 33; Ref. 18, p. 2). There was insufficient data to score this as a source.

- The dock facility has been leased and operated from many of the predecessor companies of Falcon Refinery and was acquired by NORCO in 1991 (Ref. 5, pp. 1-5). MJP Resources, Inc. later began leasing part of the dock facility. This fenced area includes a barge slip in Redfish Bay, an aboveground storage tank, an office, and other related equipment (Ref. 13, pp. 32-33, 36, Roll 3, Photos 1-3, 9). Sample SO-36 (F02KG/MF00Q1) was taken in a slight depression southwest of the barge dock facility (Ref. 14, p. 39; Ref. 18, p. 2). There was insufficient data to score this as a source.

- As part of the wastewater system, there is a surface impoundment located southeast of the last tank line and northwest of the wetlands (Figure 2). According to the December 14, 1987 inspection, the pond was in good condition. There was some evidence of instability due to the location on the coast, the possibility of flooding, and evidence of dike erosion. The impoundment has a polymer liner, the integrity of which has not been verified. The report states that the impoundment dimensions are 150 feet in length, 30 feet in width, and 3 feet in depth. The calculated volumetric capacity is 100,987 gallons (Ref. 10, p. 14). There was insufficient data to score this as a source.

- Based on the 1979 TXDOT aerial photograph of the Falcon Refinery, SO-24 (F02K5/MF00PN), SO-25 (F02K6/MF00PP) and SO-29 (F02KA/MF00PT) were collected to characterize what appeared to be historical surface impoundments (Ref. 13, p. 17, Roll2, Photo 2; Ref. 14, p. 2; Ref. 18, p. 2; Ref. 23, p. 1). There was insufficient data to score this as a source.

## 3.0 GROUND WATER MIGRATION PATHWAY

### 3.0.1 GENERAL CONSIDERATIONS

Although ground water was impacted by the January 4, 2000 spill from the naptha stabilizer unit (Ref. 38, p.22), the Ground Water Migration Pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

## 4.0 Surface Water Migration Pathway

## 4.1 Overland Flood Migration Component

### 4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

**General Considerations:**

The site is located in the San Antonio-Nueces Coastal Basin. The site lies approximately 5 feet above sea level and drains into the on-site wetlands. The topography of the site is gently sloping to the southeast as revealed by the Port Ingleside, Texas, U.S.G.S. topographic map (Ref. 4). Surface water drainage from the site enters the wetlands along the southeastern section of the refinery. A culvert connects the on-site, palustrine/estuarine wetlands to estuarine wetlands. A 1979 aerial photograph and the U.S.G.S. topographic map show a connection between the wetlands and the Intracoastal Waterway and Redfish Bay (Ref. 34, p. 1). The 15 mile Target Distance Limit (TDL) is completed in the Corpus Christi Inner Harbor and the Gulf of Mexico.

The average annual rainfall in the area is 35.0 inches (Ref. 48, p. 3). The 2-Year, 24-Hour Rainfall in the area is 4.5 inches (Ref. 49, p. 3). The site is in a 100-year floodplain (Ref. 50, p.1).

The 15 mile TDL includes the following types of coastal tidal waters:

Redfish Bay, Segment 2483

Redfish Bay is located north of Corpus Christi Bay and south of Aransas Bay. This segment, classified as effluent limited, has good water quality (Ref. 51, p. 15). Redfish Bay has an approximate water depth range from two to nine feet (Ref. 4, p.1). There are seven permitted facilities in this segment which include two domestic and five industrial wastewater discharges (Ref. 51, p.15).

Aransas Bay, Segment 2471 (Enclosed Bay System)

The Aransas Bay is an enclosed bay system that connects Ayres Bay to the north, Copano Bay to the west, and Redfish Bay to the south. In this area are the Aransas National Wildlife Refuge, Goose Island State Park, a fish hatchery, and a variety of bird sanctuaries (Ref. 54, p.23). The 1996 Surface Water Quality Inventory states that the water quality of Aransas Bay is good (Ref. 51, p. 12).

Corpus Christi Bay, Segment 2481 (Open Water Bay)

The Corpus Christi Bay is a large, open water bay that is directly west of the Padre/Mustang barrier island complex, which separates it from the Gulf of Mexico (Ref. 54, p. 25). The bay is described in the State of Texas Water Quality Inventory 1996 as Segment 2481 of the Bays and Estuaries (Ref. 51, p. 13). The water uses for this segment as designated by the State of Texas are contact recreation, exceptional aquatic life, and oyster waters. The bay receives freshwater inflows from the Nueces River and the Lake Corpus Christi/Choke Canyon reservoir system (Ref. 54, p.25).

Corpus Christi Inner Harbor, Segment 2484 (Man-made Navigational Channel)

The Corpus Christi Inner Harbor is a man-made navigation channel that connects the Port of Corpus Christi to Corpus Christi Bay. The channel is approximately 7 miles long and is dredged to 45 feet. The channel is described as Segment 2484 of the Bays and Estuaries. The water uses for this segment as designated by the State of Texas are noncontact recreation and intermediate aquatic life (Ref. 51, p.16).

Nueces Bay, Segment 2482 (Shallow, Open Water Bay)

Nueces Bay is a shallow, open water bay that lies to the west of Corpus Christi Bay. The oyster waters use is not supported in an isolated area near White's Point and is only partially supported throughout most of the rest of the bay (Ref. 51, p.14).

Gulf of Mexico, Segment 2501 (Open Water)

The Gulf of Mexico is a known fishery, including shellfish, and is identified as an exceptional quality aquatic habitat. The Gulf of Mexico is designated by the State of Texas as WQ Bay and Estuaries Segment No. 2501. WQ Segment 2501 has a total surface area of 3,879 square miles and is used for contact recreation and fishing (Ref. 51, p.17).

**Definition of Overland Segment # 1 and Probable Point of Entry (PPE) #1:**

Overall, the topography on which the refinery lies is characterized by sloping to the southeast. There is a change in the elevation from 10 to less than five feet above mean sea level as the ground dips toward the on-site wetlands (Ref. 4, p.1).

Overland segments 1 and 2 traverse the refinery site (Figure 1c).

The overland segment from Sources 1, 2, 3, 4, and 5 begins in the process area and has two off-shoots. The northwesterly off-shoot is in close proximity to the desalter, exchangers and the heater. The northeasterly off-shoot lies near the laboratory (Ref. 13, p. 10). Both offshoots enter the on-site wetlands at PPE1, southeast of the process area. Drainage from Source 1 and Source 3 migrates from between the API separator and the aeration pond (Ref. 13, p. 14, Roll 1, Photo 28). Both off-shoots enter the onsite wetlands at PPE1, southeast of the process area (Figure 8).

**Definition of Overland Segment # 2 and Probable Point of Entry (PPE) #2**

Overland segment 2 describes the hazardous substance migration route from the main process area through a pipeline to the NORCO/MJP Resources, Inc dock facility/barge slip, PPE2. $PPE_2$ is located in Redfish Bay. The dock facility has been leased and operated from many of the predecessor companies of Falcon Refinery and was acquired by NORCO in 1991 (Ref. 5, pp. 1-5). MJP Resources, Inc. later began leasing part of the dock facility. This fenced area includes a barge slip in Redfish Bay, an aboveground storage tank, an office, the pipeline outlet and other related equipment (Ref. 13, pp. 32-33, 36, Roll 3, Photos 1-3, 9). Operations at the site are connected to the dock facility. The underground pipeline runs from the pipeline outlet at the barge unloading dock facility in an undetermined path to the main facility (Figure 2; Ref. 33, pp. 1-2).

In a letter dated December 28, 1995, the consultant for MJP Resources, Inc., Mr. W.A. Hayes, P.E. of Shiner, Moseley and Associates, Inc. proposed a modified process for the barge unloading facility based on the existing system....Barge pumps with an expected maximum rate of 1,500 barrels/hour (1,050 gallons/minute) will be utilized to transfer the crude oil from the barge unloading facility through an existing piping system to four existing internal floating roof tanks. Two tanks have a capacity of 55,000 barrels (2,310,000 gallons) each and two tanks have a capacity of 20,000 barrels (840,000 gallons) each. The crude oil will be routed to the appropriated tank or tanks depending upon the size of the barge being unloaded. The crude oil will be emptied from the storage tans to transport trucks by means of an existing truck rack. The maximum pump rate at the truck rack is 300 barrels/hour (210 gallons/minute). The truck rack operations includes the use of a vapor recovery system." (Ref. 47, pp.1-2).

**Definition of In-Water Segment:**

The Target Distance Limit (TDL) for the Falcon Refinery site extends in an arc from PPE1, to a distance of 15 miles in tidally influenced water bodies (Figure 3). The HRS in-water segment extends from $PPE_1$ at the on-site wetlands area through connecting wetlands to Redfish Bay and then 13.98 miles out in all directions. The TDL will pass through the Redfish Bay, Corpus Christi Bay, Aransas Bay, and Gulf of Mexico segments (Figure 8).

**Level II Contamination: Coastal Tidal Waters and Associated Wetlands** From PPE #1 to sediment sample SE-14 (F02HS/MF00NB)

**Wetlands**

The wetlands encountered are described as palustrine emergent areas and estuarine intertidal emergent areas that are regularly and irregularly flooded (Ref. 53, p.1) which meet the HRS wetland definition. The HRS-qualifying wetland frontage equals 1.32 miles to the culvert connecting the wetlands to Redfish Bay (Figure 4).

Another area of HRS qualifying wetlands extend to the south-southwest to SE-27 (F02J7/MF00NQ), according to a 1979 aerial photograph of the area (Ref. 34, p. 1). The wetlands encountered are described as palustrine emergent areas that are persistent and seasonally flooded (Ref. 53, p.1) which meet the HRS wetland definition. There are 0.34 miles of HRS defined wetland frontage in this area (Figure 4).

Figure 3 Surface Water Pathway Overflow: HRS In-Water Segments for PPE #1 and PPE #2
A copy of this figure is available at the EPA Docket Center

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Figure 4 Surface Water Pathway Overland Flow: Environmental Threat
A copy of this figure is available at the EPA Docket Center

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**Potential Contamination: Coastal Tidal Waters From SE-31 (F02JBDL/MF00NW to Redfish Bay, Corpus Christi Bay, Aransas Bay, Gulf of Mexico, and the Corpus Christi Inner Harbor**

**Intracoastal Waterway and Redfish Bay**

The Falcon Refinery dock facility ($PPE_2$ ) is located in designated Water Quality Segment No. 2483 (Redfish Bay - Bays and Estuaries Segment) (Ref. 51, p. 15). Segment 2483 has a total surface area of 28.8 square miles and designated for contact recreation and fishing (Ref. 51, p.15).

**Corpus Christi Bay**

The Corpus Christi Bay is a large, open water bay that is directly west of the Padre/Mustang barrier island complex, which separates it from the Gulf of Mexico. The bay is described as Segment 2481 of the Bays and Estuaries. The water uses for this segment as designated are contact recreation, exceptional aquatic life and oyster waters (Ref. 51, p. 13). The Corpus Christi Bay is an estuarine subtidal area with unconsolidated bottoms. Known resources for this open water bay include recreational and commercial fishing, and oyster harvesting (Ref. 51, p. 13).

**Aransas Bay**

Aransas Bay is a known fishery, including shellfish, and is identified as a exceptional quality aquatic habitat (Ref. 51, p. 12). Aransas Bay is designated as WQ Bay and Estuaries Segment No. 2471. Numerous estuarine wetland environments are located in this segment. The total surface area of Segment 2471 is 87.8 square miles and has a designated use for contact recreation and fishing (Ref. 51, p. 12).

**Gulf of Mexico**

The Gulf of Mexico is a known fishery, including shellfish, and is identified as an exceptional quality aquatic habitat. The Gulf of Mexico is designated as WQ Bay and Estuaries Segment No. 2501. WQ Segment 2501 has a total surface area of 3,879 square miles and designated being used for contact recreation and fishing (Ref. 51, p. 17). Numerous palustrine and estuarine wetland environments are located in WQ Segment 2501 (Ref. 55, p. 1).

**Nueces Bay**

Nueces Bay is a known fishery, including shellfish, and is identified as a exceptional quality aquatic habitat. Nueces Bay is designated as WQ Bay and Estuaries Segment No. 2482. The total surface area of Segment 2482 is 28.9 square miles and has a designated use for contact recreation and fishing (Ref. 51, p. 14).

**Corpus Christi Inner Harbor**

The Corpus Christi Inner Harbor is a estuarine subtidal area with unconsolidated bottoms, excavated. No significant natural freshwater inflows to the channel, although the City of Corpus Christi storm water outlets and runoff from the surrounding industrialized areas flow into the channel. The inner harbor is used as an industrial/commercial ship channel, however, there are areas along the banks that meet the HRS definition of wetland areas (Ref. 54, p. 26).

### 4.1.2 Drinking Water Threat

The drinking water threat was not evaluated due to lack of targets for this component. The documentation for an observed release to surface water follows, then will proceed to the human food chain threat and the environmental threat.

#### 4.1.2.1 Likelihood of Release

##### 4.1.2.1.1 Observed Release

An observed release to a qualifying surface water body can be documented in the HRS by two methods: a) direct observation or b) chemical analysis. We will document the observed release by chemical analysis in this Documentation Record.

Chemical Analysis

An observed release has been documented to the surface water pathway for the site by chemical analysis (Table 31). Establishing an observed release by chemical analysis requires attributing the hazardous substance(s) to the site, and also requires determining background, demonstrating that the concentration of the hazardous substance(s) in a release sample is significantly increased above background, and attributing some portion of the significant increase to the site. In order to document a significant increase above background, it is necessary to establish the presence of hazardous substance(s) at concentrations which equal or exceed the Sample Quantitation Limit and three times above a designated background level (Ref. 1, Table 2-3).

**Background Concentration**

The following table provides a summary of the designated background levels for the organic and inorganic hazardous substances of concern for this site.

Four (4) background sediment samples, SE-06 (F02HJ/MF00N3), SE-07 (FO2HK/MFOON4), SE-08 (FO2HL/MFOON5) and SE-28 (FO2J8/MFOONR) were collected during the ESI. See Figure 5 and Table 28 for the locations of all background sediment samples collected. A summary of the highest constituent concentrations detected in the background sediment samples is presented in Table 29.

Figure 5 Surface Water Pathway Overland Flow: Background Sediments Samples
A copy of this figure is available at the EPA Docket Center

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**Table 28**
**Surface Water Pathway**
**Background Sediment Samples Collected from Wetlands and Redfish Bay**

| CLP Sample ID | Sample Location | Sample Depth | Date Collected | Location Reference |
|---|---|---|---|---|
| SE-06 F02HJ/MF00N3 | Intracoastal Waterway/ Redfish Bay, north of Aker Gulf Marine | Composite sample 0"-10" | 5/16/00 | Ref. 13, p. 13, Roll 1, Photo 26; Ref. 14, p. 20; Ref. 18, p. 3 |
| SE-07 F02HK/MF00N4 | HRS defined wetlands north of Aker Gulf Marine | Composite sample 0"-12" | 5/15/00 | Ref. 13, p. 3, Roll 1, Photo 6; Ref. 14, p. 4; Ref. 18, p. 2 |
| SE-08 F02HL/MF00N5 | HRS defined wetlands north of Aker Gulf Marine | Composite sample 0"-6" | 5/15/00 | Ref. 13, p.4, Roll 1, Photo 7; Ref. 14, p. 5; Ref. 18, p. 2 |
| SE-28 F02J8/MF00NR | HRS defined wetlands south near Garrett Road | Composite sample 0"-4" | 5/16/00 | Ref. 13, p. 18, Roll 2, Photo 4; Ref. 14, p. 43; Ref. 18, p. |

Background sample SE-06 was used to determine observed releases for samples SE-30, and SE-31. These samples were taken within similar physical and hydrologic features of the Intracoastal Waterway/Redfish Bay.

Background samples SE-07, SE-08, and SE-28 were used to determine observed releases for SE-14, SE-20, SE-21, and SE-27, . These samples were taken in HRS-qualifying wetlands under the similar coastal tidal conditions, except for SE-27. According to the 1979 aerial photo, this sample location was influenced by coastal tidal waters (Ref. 23, p. 1), but the location is currently land-locked (Figure 6).

Composite sampling in these areas was necessary to obtain enough sample for sample analysis. The core sampler was advanced into the accumulated sediment layer until the level of compaction or the lithology prevented the core sampler from advancing to a greater depth.

Figure 6 Surface Water Pathway Overland Flow: Sediment Samples
A copy of this figure is available at the EPA Docket Center

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**Table 29**
**Surface Water Pathway**
**Summary of Highest Organic and Inorganic Constituents Detected in Background Sediment Samples**

| Volatile or Semivolatile Organic Constituent | Station/ CLP No. (event) | Highest Concentration [SQL] µg/Kg | 3 x Highest Background Concentration | Reference |
|---|---|---|---|---|
| Fluoranthene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Pyrene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Benzo(a)anthracene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Chrysene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Chrysene | SE-08/F02HL | ND [480] | NA | Ref. 19, pp. 13, 14, 29, 121 |
| Benzo(b)fluoranthene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Benzo(k)fluoranthene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Benzo(a)pyrene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Indeno(1,2,3-cd)pyrene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Benzo(g,h,i)perylene | SE-06/F02HJ | ND [430] | NA | Ref. 19, pp. 13, 14, 31, 115 |
| Benzo(g,h,i)perylene | SE-08/F02HL | ND [480] | NA | Ref. 19, pp. 13, 14, 29, 121 |
| **Inorganic Constituent** | **Station/ CLP No. (event)** | **Highest Concentration [SQL] mg/Kg** | **3 x Highest Background Concentration** | **Reference** |
| Barium | SE-08 MF00N5 | 104 [58.4] | 312 | Ref. 20, pp. 10, 16, 24 |
| Copper | SE-08 MF00N5 | 9.9J^ [7.3]* | 29.7 | Ref. 20, pp. 10, 16, 24 |
| Manganese | SE-07 MF00N4 | 250J^ [4.2]* | 750 | Ref. 20, pp. 10, 16, 24 |
| Mercury | SE-08 MF00N5 | ND [0.15] | NA | Ref. 20, pp. 10, 16, 24 |

[ ] = SQL values for each constituent.
ND = Not detected. Concentrations for these constituents were not detected at the reported quantitation limit in sediment samples considered for the development of sediment background levels.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.
N/A = Not Applicable
* See Table 32 for Qualified Data

All sediment samples were collected using a stainless steel core sampler into which dedicated polyethylene zero-contamination tubes had been inserted and the end fitted with dedicated screw-on tips. All samples were collected according to the EPA approved Quality Assurance Project Plans and sample locations were approved by the EPA prior to sample collection.

## Contaminated Samples

The following samples meet the observed release criteria and are presented below indicating organic and inorganic hazardous substances with their concentrations and SQLs. These samples were qualified as "releases" based on the criteria in Table 2-3 (Ref. 1, p. 51589).

**Table 30**
**Surface Water Pathway**
**Contaminated Sediment Samples Collected from Wetlands and Redfish Bay**

| Station/ CLP ID No. | Sample Location | Sample Depth | Date Collected | Location Reference |
|---|---|---|---|---|
| SE-14 MF00NB | HRS defined wetlands between Sunray Road & Aker Gulf Marine | Composite sample 0"-30" | 5/16/00 | Ref. 13, p. 10, Roll 1, Photo 19; Ref. 14, p. 10, Ref. 18, p. 2 |
| SE-20 F02J0 | HRS defined wetlands at NORCO | Composite sample 0"-12" | 5/17/00 | Ref. 13, p. 20, Roll 2, Photo 7; Ref. 14, p. 44; Ref. 18, p. 2 |
| SE-21 F02J1 | $PPE_1$ at NORCO in HRS defined wetlands | Composite sample 0"-5" | 5/17/00 | Ref. 13, p. 20, Roll 2, Photo 8; Ref. 14, p. 41; Ref. 18, p. 2 |
| SE-27 F02J7 MF00NQ | HRS defined wetlands on Garrett Construction Co. property | Grab sample 0"-30" | 5/17/00 | Ref. 13, p. 18, Roll 2, Photo 3; Ref. 14, p. 41; Ref. 18, p. 3 |
| SE-30 F02JA MF00NT | PPE #2 in Redfish Bay - NORCO/MJP Resources, Inc. barge unloading dock | Composite sample 0"-12" | 5/16/00 | Ref. 13, p. 12, Roll 1, Photo 23; Ref. 14, p. 20; Ref. 18, p. 3 |
| SE-31 F02JB | Southwesy of NORCO/MJP Resources, Inc. barge unloading dock in Redfish Bay | Composite sample 0"-30" | 5/16/00 | Ref. 13, p. 11, Roll 1, Photo 21; Ref. 14, p. 21; Ref. 18, p. 3 |

**Table 31**
**Surface Water Pathway - Observed Releases**
**from Sediment Samples Collected from HRS defined wetlands and Redfish Bay**

| Sample Location/CLP ID | Hazardous Substance | Concentration | [SQL] | Reference |
|---|---|---|---|---|
| SE-14/MF00NB | Barium | 162 mg/Kg | [58.7] | Ref. 20, pp. 9, 16, 30 |
| | Manganese | 267J^ mg/Kg | [4.4] | Ref. 20, pp. 9, 16, 30 |
| | **Mercury** | **0.27 mg/Kg** | **[0.15]** | **Ref. 20, pp. 9, 16, 30** |
| | Pyrene | 640LJ µg/Kg | [2400] | Ref. 21, pp. 11, 12, 20, 53 |
| | Chrysene | 960LJ µg/Kg | [2400] | Ref. 21, pp. 11, 12, 20, 53 |
| | Benzo(b)fluoranthene | 220LJ µg/Kg | [2400] | Ref. 21, pp. 11, 12, 20, 53 |
| | Benzo(a)pyrene | 2200LJ µg/Kg | [2400] | Ref. 21, pp. 11, 12, 20, 53 |
| | Indeno(1,2,3-cd)pyrene | 280LJ µg/Kg | [2400] | Ref. 21, pp. 11, 12, 20, 53 |
| | **Benzo(g,h,i)perylene** | **3700 µg/Kg** | **[2400]** | **Ref. 21, pp. 11, 12, 20, 53** |
| SE-20/MF00NH | Barium | 138 µg/Kg | [62.2] | Ref. 16, pp. 9, 15, 21 |
| | Manganese | 352 µg/Kg | [4.7] | Ref. 16, pp. 9, 15, 21 |
| SE-21/F02J1 | Fluoranthene | 52LJ µg/Kg | [440] | Ref. 21, pp. 11, 12, 20, 56 |
| | Pyrene | 42LJ µg/Kg | [440] | Ref. 21, pp. 11, 12, 20, 56 |
| E-21/F02J1 | Chrysene | **560 µg/Kg** | **[440]** | **Ref. 21, pp. 11, 12, 20, 56** |
| | Benzo(b)fluoranthene | 140LJ µg/Kg | [440] | Ref. 21, pp. 11, 12, 20, 56 |
| | Indeno(1,2,3-cd)pyrene | 180LJ µg/Kg | [440] | Ref. 21, pp. 11, 12, 20, 56 |
| | **Benzo(g,h,i)perylene** | **1200 µg/Kg** | **[440]** | **Ref. 21, pp. 11, 12, 20, 56** |
| SE-21/MF00NJ | Barium | 169 mg/Kg | [52.5] | Ref. 20, pp. 5, 9, 31 |
| | Manganese | 186J^ mg/Kg | [3.9] | Ref. 20, pp. 5, 9, 31 |
| SE-27/MF00NQ | **Barium** | **1940 mg/Kg** | **[57.3]** | **Ref. 20, pp. 9, 15, 33** |
| | **Manganese** | **1190J^mg/Kg** | **[4.3]** | **Ref. 20, pp. 9, 15, 33** |
| SE-30/F02JADL | **Fluoranthene** | **8300 µg/Kg** | **[2500]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Pyrene** | **10000 µg/Kg** | **[2500]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Benzo(a)anthracene** | **6000 µg/Kg** | **[2500]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Chrysene** | **6600 µg/Kg** | **[2500]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Benzo(b)fluoranthene** | **4000 µg/Kg** | **[2500]** | **Ref. 21, pp. 11, 12, 21, 71** |

**Table 31 continued**
**Surface Water Pathway - Observed Releases**
**from Sediment Samples Collected from HRS defined wetlands and Redfish Bay**

| Sample Location/ CLP ID | Hazardous Substance | Concentration | [SQL] | Reference |
|---|---|---|---|---|
| SE-30/F02JADL | **Benzo(k)fluoranthene** | **3100 µg/Kg** | **[490]** | **Ref. 21, pp. 11, 12, 21, 71** |
| SE-30/F02JA | **Benzo(a)pyrene** | **3700 µg/Kg** | **[490]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Indeno(1,2,3-cd)pyrene** | **1500 µg/Kg** | **[490]** | **Ref. 21, pp. 11, 12, 21, 71** |
| | **Benzo(g,h,i)perylene** | **1500 µg/Kg** | **[490]** | **Ref. 21, pp. 11, 12, 21, 71** |
| SE-30/MF00NT | **Barium** | **464 mg/Kg** | **[53.1]** | **Ref. 16, pp. 9, 15, 25** |
| | Manganese | 66 mg/Kg | [4.0] | Ref. 16, pp. 9, 15, 25 |
| | Mercury | 0.19UC mg/Kg | [0.13] | Ref. 16, pp. 9, 15, 25 |
| SE-31/F02JB | **Fluoranthene** | **5200 µg/Kg** | **[2000]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Pyrene** | **6100 µg/Kg** | **[2000]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Benzo(a)anthracene** | **3200 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21,74** |
| | **Chrysene** | **3000 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Benzo(b)fluoranthene** | **2500 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Benzo(k)fluoranthene** | **2300 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Benzo(a)pyrene** | **2800 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Indeno(1,2,3-cd)pyrene** | **1400 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| | **Benzo(g,h,i)perylene** | **1400 µg/Kg** | **[400]** | **Ref. 21, pp. 11, 12, 21, 74** |
| SE-31/MF00NW | Barium | 106 mg/Kg | [51.0] | Ref. 16, pp. 9, 16, 26 |
| | Manganese | 12.1 mg/Kg | [3.8] | Ref. 16, pp. 9, 16, 26 |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.
[ ] = Sample Quantitation Limit.
J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

Organics: ND=Not detected at the reported sample quantitation limit [SQL]
^ = High biased. Estimated concentration may be lower than the concentration reported.
L = Reported concentration is below the CRQL.
T = Identification is questionable because of absence of other commonly coexisting pesticides.

Inorganics: ND =Not detected at the laboratory reported detection limit (IDL).
^ = High bias. Estimated concentration may be lower than the concentration reported.
UC = Reported concentration should be used as a raised detection limit because of apparent blank contamination.
L = Reported concentration is between the IDL and the CRDL.

**Table 32**
**Surface Water Pathway**
**Data Usability for Background Sediment Samples**

| Sample Location/ CLP ID | Hazardous Substance | Concentration (SQL) [mg/Kg] | Bias | Bias Correction Calculation | Background Concentration Corrected for Bias | Usable as a Back-ground Value? |
|---|---|---|---|---|---|---|
| SE-08 MF00N5 | Copper | 9.9J^mg/Kg [7.3] | High | None | ------- | Yes |
| SE-07 MF00N4 | Manganese | 250J^mg/Kg [4.2] | High | None | ------ | Yes |

**Table 33**
**Surface Water Pathway**
**Data Usability for Observed Release Sediment Samples**

| Sample Location/ CLP ID | Hazardous Substance | Concentration [SQL] | Bias | Bias Correction Calculation | Release Concentration Corrected for Bias | Usable as a Release Value? |
|---|---|---|---|---|---|---|
| SE-27 MF00NB | Manganese | 1190J^mg/Kg [4.3] | High | 1190÷1.24 | 960 | Yes |

General: Shaded and **bold** = Sample result at or above Sample Quantitation Limit.

[ ] = Sample Quantitation Limit.

J = The value is estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this sample.

^ = High bias. Estimated concentration may be lower than the concentration reported.

A discussion of data usability can be found in Reference 56.

Attribution:

The Falcon Refinery, a.k.a. National Oil Recovery Corporation (NORCO), site consists of a refinery that has operated intermittently since 1980 and is currently inactive. When in operation, the refinery operated at a 40,000 barrels per day capacity with primary products consisting of naphtha, jet fuel, kerosene, diesel, and fuel oil (Ref. 38, p. 18). Wastes at the refinery include CERCLA-eligible hazardous substances as defined by 40 CFR Part 261.32 including K048 (dissolved air flotation float), K049 (slop oil emulsion solids), K050 (heat exchanger bundle cleaning sludge), and K051(API separator sludge), which, according to a Notification of Hazardous Waste Activity, signed on October 20, 1980 by Mr. Eugene W. Hodge, Vice President of UNI Refining, Inc., were documented to be in sources at the facility (Ref. 7, pp. 1-2). Other CERCLA-eligible hazardous substances at the site include: vinyl acetate, which was detected inside tanks during a EPA Criminal Investigation Division (CID) criminal investigation and a TNRCC Region 14 sampling event (Ref. 27, p.1; Ref. 30, pp. 4-9; Ref. 31, pp. 3, 4, 15, 19), and chromium detected in deposited cooling tower sludges (Ref. 9, p. 18), as well as untreated wastewater release inside tank berms (Ref. 9, p. 10).

Figure 7 Adjacent Properties Map
A copy of this figure is available at the EPA Docket Center

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In addition, the following CERCLA-eligible hazardous substances have been detected in the sources during previous TNRCC and TACB investigations at the site, as shown in a Core Laboratories Analytical Reports obtained from soil and source samples collected: benzene, butanol, cyclohexane, cyclohexanediol, 1,2-dichloroethane, N, N-diphenylamine, ethyl ether, hexane, isopropylbenzene (Cumene), methyl ethyl ketone, methyl isobutyl ketone (MIBK), Total Organic Halogens, 1-phenylethanol, N-propylbenzene, styrene, tert-butyl methyl ether (MTBE), tetrachloroethene, vinyl acetate, barium, chromium, lead, mercury, fluorene, fluoranthene, 2-methylnaphthalene, naphthalene, phenanthrene, benzene, ethylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, xylenes, 2,4-dimethylphenol, acenaphthene, 2-methylphenol (o-cresol), 3&4 methylphenol (m&p cresol), chrysene, 2,4-dimethylphenol, pyrene and phenol (Ref. 26, pp. 15-54; Ref. 31, pp. 7-26; Ref. 32, pp. 4-13; Ref. 35, pp. 3-14).

The site lies approximately 5 feet above mean sea level and drains into the on-site wetlands. The topography of the site is gently sloping to the southeast as revealed by the Port Ingleside, Texas, U.S.G.S. topographic map (Ref. 4). Surface water drainage from the site enters the wetlands along the southeastern section of the refinery. A culvert connects the on-site, palustrine/estuarine wetlands to estuarine wetlands. A 1979 aerial photography and the U.S.G.S. topographic map shows a connection between the wetlands to the Intracoastal Waterway and Redfish Bay (Ref. 4, p. 1; Ref. 34, p. 1). The 15 mile Target Distance Limit (TDL) is completed in the Corpus Christi Inner Harbor and the Gulf of Mexico (Figures 3a and 3b). The hazardous substances found in sources at the Falcon Refinery facility have also been found at PPE-1 and in onsite wetlands at sediment samples SE-20, SE-21, and SE-14 as well as in Redfish Bay adjacent to PPE-2 at SE-30 and SE-31.

Other Potential Sources:

There are several nearby industrial facilities: Plains Marketing, Garrett Construction Company, Aker Gulf Marine, IBC Petroleum, Inc., Alamo Concrete Products, Ltd., Brown & Root, Inc., Ingleside Properties, Inc., Offshore Specialty Fabricators, and Gulf Conservation Corporation in the vicinity of the Falcon Refinery. (See Figure 7).

Plains Marketing lies adjacent to the northern section of the Falcon Refinery(Ref. 57, p. 3). This facility was a crude oil topping facility with a production capacity of 10,000 barrels per day and now operates as a petroleum storage and transfer terminal (Ref. 57, p. 6). During the inspection at the Plains Marketing (formerly ARM Refining) facility in December 1985, the TWC documented an oil spill from an ARM pipeline which caused pollution to the surface waters of the State (Ref. 58, pp. 2-3).

To the south of the Falcon Refinery, the Garrett Construction Company is located at Garrett Road and FM 2725 in Ingleside. A TNRCC file review revealed air permit exemptions regarding a sand and gravel screening plant, an outdoor dry abrasive blast facility, and a rock crusher unit for this construction company (Ref. 60, p. 1-5).

Aker Gulf Marine - Aransas Pass Yard is located northeast of the Falcon Refinery (Figure 7). Aker Gulf Marine is a fabricator of offshore structures and other petroleum related structures for the oil and gas industry (Ref. 61, p. 5). The Aransas Pass Yard is the site where structural components are fabricated(Ref. 61, p. 6). This facility has a permitted discharge point into the Intracoastal Water/Redfish Bay under Texas Pollutant Discharge Elimination System (TPDES) permit (Ref. 62, p. 1).

IBC Petroleum and Pi Energy are located immediately northwest of the Dock Facility (PPE-2). Sample SO-05 (F02JJ/MF00P3) (Ref. 42, pp. 67-69; Ref. 43, p. 20) was taken northwest of the NORCO dock facility. The soil sample location was collected at the location of leaking equipment on the IBC Petroleum property. The constituents detected in that sample were not detected in the samples collected adjacent to the dock facility, SE-30 (F02JA/MF00NT) (Ref. 21, pp. 9, 11, 12, 21; Ref. 16, pp. 9, 15, 25) and SE-31 (F02JB/MF00NW) (Ref. 21, pp. 9, 11, 12,40-42, 73-78; Ref. 16, p. 9, 16, 26).

Alamo Concrete Products, LTD., (formerly Coast Materials, Inc.) is an inactive concrete batch plant located northeast of the NORCO/MJP Resources dock facility and north of Sunray Road (Figure 7; Ref. 63, pp. 1-2;Ref. 64, p. 1).The type of air contaminants associated with Coast Materials, Inc. included fly ash, cement, cement and aggregate, and dust (Ref. 65, p. 1).

Brown & Root, Inc. is located off of Bay Avenue and Bishop Road (Figure 7) (Ref. 66, p. 1). There has been minor soil contamination resulting from a Leaking Petroleum Storage Tank. However, the case was closed by TNRCC (Ref. 67, p. 1). Brown & Root applied for an air permit relating to abrasive blast cleaning in May 14, 1985 (Ref. 68, p.1). No wastewater discharge permit was located for this facility.

Ingleside Properties, Inc. a.k.a. Dugat Docks is a facility located at the end of Bishop Road and the North Bank Terminal on the Intracoastal Waterway/Redfish Bay. The operation described in the permit application is as a drilling fluids chemicals terminal and oil field waste treatment plant (Ref. 69, p. 1).

Gulf Conservation Corporation (GCC) is located on the Intracoastal Waterway/Redfish Bay north of the NORCO/MJP Resources, Inc., dock facility and south of Aker Gulf Marine (Figure 7). On December 2, 1995, a spill occurred of approximately 170 gallons of unknown petroleum hydrocarbon at the GCC (Ref. 72, p. 1). The report states that there was not any receiving water for the spill. Acetone, chloromethane, and methyl ethyl ketone (2-butanone) was detected in a soil sample collected on September 18, 1996 (Ref. 71, pp 3-6). The contaminated soil was removed from the site (Ref. 70, pp. 1-2).

Observed Release:

The hazardous substances found in sources at the Falcon Refinery facility have also been found at PPE-1 and in onsite wetlands at sediment samples SE-20, SE-21, and SE-14 as well as in Redfish Bay adjacent to PPE-2 at SE-30 and SE-31.

The constituents found in the sediment samples qualify as observed releases and are attributable to the sources identified at the Falcon Refinery facility and were found in soil samples collected during the 2000 site sampling investigation by TNRCC.

Hazardous Substances Released:

| | | |
|---|---|---|
| Fluoranthene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene |
| Pyrene | Benzo(k)fluoranthene | Barium |
| Chrysene | Benzo(a)pyrene | Manganese |
| Benzo(a)anthracene | Indeno (1,2,3-cd) pyrene | Mercury |

**Observed Release Factor Value: 550**

### 4.1.3 Human Food Chain Threat

#### 4.1.3.1 Human Food Chain Threat - Likelihood of Release

#### 4.1.3.2 Human Food Chain Threat Waste Characteristics

##### 4.1.3.2.1 Toxicity/Persistence/Bioaccumulation

The hazardous substances eligible to be evaluated for toxicity/persistence/ bioaccumulation under the Human Food Chain Threat-Waste Characteristics includes all those hazardous substances eligible to be evaluated for toxicity/persistence in the Drinking Water Threat for the watershed (Ref. 1, Section 4.1.3.2.1).

###### 4.1.3.2.1.1 Toxicity Factor Value

The human food chain toxicity factor value for each hazardous substance was obtained from the Superfund Chemical Data Matrix (SCDM), 1996 (Ref. 3). The factor value for each hazardous substance evaluated is assigned in Table 34.

###### 4.1.3.2.1.2 Persistence Factor Value

Surface water human food chain persistence factor values for each hazardous substance of the predominant water category "River" were obtained from the SCDM, 1996 (Ref. 3). The factor value for each hazardous substance evaluated is assigned in Table 34.

###### 4.1.3.2.1.3 Bioaccumulation Potential Factor Value

Surface water human food chain bioaccumulation potential factor values for each hazardous substance are defined for both fresh water and salt water in the SCDM, 1996 (Ref. 3). The factor value for each hazardous substance is evaluated under the salt water criteria and the value is assigned in Table 34.

Redfish Bay is designated as part of the Nueces Estuary. An estuary is defined as "a semi-enclosed coastal body of water having a free connection to the open sea and within which sea-water is measurably diluted with fresh water derived from land drainage" (Ref. 73, p. 32). Salt water will be used to evaluate this site (Ref. 2, p. 239).

**Table 34**
**Human Food Chain Threat - Waste Characteristics**
**Toxicity/Persistence/Bioaccumulation Factor Values**

| Hazardous Substance | Source Number | Toxicity Factor Value | Persistence Factor Value | Bioaccum. Potential Factor Value | Tox/Per/Bio Factor Value | Reference |
|---|---|---|---|---|---|---|
| Fluoranthene | 2 | 100 | 1.0 | 5000 | $5 \times 10^5$ | Ref. 1, 3 |
| Pyrene | 2, 5 | 100 | 1.0 | 5000 | $5 \times 10^5$ | Ref. 1, 3 |
| Benzo(a)anthracene | 2 | 1000 | 1.0 | 50000 | $5 \times 10^7$ | Ref. 1, 3 |
| Chrysene | 1, 2, 3, 5 | 10 | 1.0 | 500 | 5000 | Ref. 1, 3 |
| Benzo(b)fluoranthene | 2 | 1000 | 1.0 | 50000 | $5 \times 10^7$ | Ref. 1, 3 |
| Benzo(k)fluroanthene | 2 | 100 | 1.0 | 50000 | $5 \times 10^6$ | Ref. 1, 3 |
| Benzo(a)pyrene | 2 | 10000 | 1.0 | 500 | $5 \times 10^6$ | Ref. 1, 3 |
| Indeno(1,2,3-cd) pyrene | 2 | 1000 | 1.0 | 50000 | $5 \times 10^7$ | Ref. 1, 3 |
| Benzo(g,h,i)perylene | 2 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Barium | 3 | 10000 | 1.0 | 0.5 | 5000 | Ref. 1, 3 |
| Copper | 1, 3, 5 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Manganese | 1, 3, 5 | 10000 | 1.0 | 0.5 | 5000 | Ref. 1, 3 |
| Mercury | 3 | 10000 | 0.4 | 50000 | $2 \times 10^8$ | Ref. 1, 3 |

Note: "River" was the predominant surface water body type used for factor value determination. Factor values for each hazardous substance were obtained from the Superfund Chemical Data Matrix (SCDM) 1996. Bioaccumulation factor (BCF) data are available in the Superfund Chemical Data Matrix (SCDM) 1996 for both fresh water and salt water for the hazardous substances evaluated at a site. Salt water BCF data were used in evaluating this site.

According to the Hazard Ranking System, mercury is the substance with the highest Toxicity/Persistence/Bioaccumulation Factor Value (Ref. 1, Table 4-6; Ref.2).

**Toxicity/Persistence/Bioaccumulation Factor Value: $2 \times 10^8$**

#### 4.1.3.2.2 Hazardous Waste Quantity

Below are the Hazardous Waste Quantity Values for Sources 1 through 5 as described in previous text.

**Table 35**
**Surface Water Pathway**
**Hazardous Waste Quantity - Human Food Chain**

| Source Number | Source Hazardous Waste Quantity Value (Sec. 2.4.2.1.5) | Is Source Hazardous Constituent Quantity data complete? (yes/no) |
|---|---|---|
| 1 | 1.47 | no |
| 2 | >0, | no |
| 3 | >0 | no |
| 4 | 102.70 | no |
| 5 | >0, | no |
| Sum of Values: | >0> | |

According to Section 2.4.2.2. of the HRS Rule, a hazardous waste quantity factor value of 100 was assigned because the hazardous constituent quantity data is not adequately determined for one or more sources, and targets for the Surface Water Migration Pathway are subject to Level II concentrations (Ref. 1, Section 2.4.2.2).

**Hazardous Waste Quantity Factor Value: 100**

4.1.3.2.3 Waste Characteristics Factor Category Value

A Waste Characteristics Factor Category Value is based on the Waste Characteristics Product. The Waste Characteristics Product is the product of the Toxicity/Persistence Factor Value, the Hazardous Waste Quantity Factor Value and the Bioaccumulation Potential Factor Value.

(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential = Waste Characteristics Factor Category Value

Where:
Toxicity/Persistence Factor Value = 4,000
Hazardous Waste Quantity Factor Value = 100 (Default Value)
And:
Toxicity/Persistence x Hazardous Waste Quantity =
$4{,}000 \times 100 = 4 \times 10^5$

Where:
Toxicity/Persistence x Hazardous Waste Quantity = $4 \times 10^5$
Bioaccumulation Potential Factor Value = 50,000
And:
(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential =
$4 \times 10^5 \times 50{,}000 = 2 \times 10^{10}$

A Waste Characteristics Product of $2 \times 10^{10}$ receives a Waste Characteristics Factor Category Value of 320 (Ref. 1, Table 2-7).

**Waste Characteristics Factor Category Value: 320**

### 4.1.3.3 Human Food Chain Threat - Targets

#### 4.1.3.3.1 Food Chain Individual

The Corpus Christi/Redfish Bay fishery has been documented to be subject to potential contamination (Ref. 1, Section 4.1.3.3.1).

Mr. Beau Hardegree of the TPWD Lower Coast Conservation Assessment Program stated there are "many people that fish every day in Redfish Bay adjacent to that site" (Ref. 75, p. 1).

According to the HRS, if there is an observed release of a hazardous substance having a bioaccumulation potential factor value of 500 or greater to surface water in the watershed and there is a fishery present anywhere within the TDL, assign a value of 20, (Ref. 1, Section 4.1.3.3.1). Sediment samples which meet the criteria of an observed release for the watershed are shown in Table 31 and the hazardous substances detected in these samples that have bioaccumulation potential factor values of 500 or greater are presented in Table 34.

**Food Chain Individual Factor Value: 20**

Figure 8 Surface Water Pathway Overland Flow: Human Food Chain / Environmental Threat
A copy of this figure is available at the EPA Docket Center

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Closed Fisheries

There is no data available that indicates that any portion of the fisheries within the target distance limit is closed due to contamination related to hazardous substances documented as an observed release during the Falcon Refinery sampling event.

#### 4.1.3.3.2 Population

##### 4.1.3.3.2.1 Level I Concentrations

Level I concentrations have not been documented for the surface water pathway.

##### 4.1.3.3.2.2 Level II Concentrations

Level II concentrations have been documented for the human food chain threat of the surface water pathway based on an observed release in sediment samples SE-30 and SE-31. However, EPA has not included documentation of fishing within this narrow zone of Level II concentrations (from PPE 2 -Redfish Bay to SE- 30 and SE-31). Therefore, only potential Human Food Chain Population will be scored.

##### 4.1.3.3.2.3 Potential Human Food Chain Contamination

**Table 36**
**Surface Water Pathway**
**Potential Human Food Chain Contamination**

| Fishery | Annual Production (pounds) | Surface Water Body Type | Average Annual Flow | Population Value (Pi) | Dilution Weight (Di) | Pi x Di | Reference |
|---|---|---|---|---|---|---|---|
| Corpus Christi Bay includes Redfish Bay | *>0 | Coastal tidal waters | 0 (Tidal Flow) | .03 | 0.0001 | $3 \times 10^{-6}$ | Ref. 1, Tables 4-13, 4-18; Ref. 74, pp. 28 |
| Aransas Bay | **>0 | Coastal tidal waters | 0 (Tidal Flow) | .03 | 0.0001 | $3 \times 10^{-6}$ | Ref. 1, Tables 4-13, 4-18; Ref. 74, pp. 21 |

Corpus Christi Bay

The Corpus Christi Bay is a large, open water bay that is directly west of the Padre/Mustang barrier island complex, which separates it from the Gulf of Mexico. The bay is described as Segment 2481 of the Bays and Estuaries. Known resources for this open water bay include recreational and commercial fishing, and oyster harvesting (Ref. 51, p. 13).

Mr. Beau Hardegree of the TPWD Lower Coast Conservation Assessment Program stated there are "many people that fish every day in Redfish Bay adjacent to that site" (Ref. 75, p. 1).

* The reported annual commercially landed human food chain organisms (finfish and shellfish) for the Corpus Christi Bay in 1997 was 2,088,007 pounds (Ref. 74, p. 28); however, not all of the poundage can be apportioned to the site 15-mile TDL which extends zero to 15 miles into the Corpus Christi Bay (which includes Redfish Bay). Therefore, a conservative estimate of greater than zero pounds will be used.

Aransas Bay

Aransas Bay is a known fishery, including shellfish, and is identified as a exceptional quality aquatic habitat (Ref. 51, p. 12). Aransas Bay is designated as WQ Bay and Estuaries Segment No. 2471. This in-water segment which extends approximately 7.31 to 15.0 miles into the bay (Figure 3).

** The reported annual commercially landed human food chain organisms (finfish and shellfish) for the Aransas Bay in 1997 was 4,177,828 pounds (Ref. 74, p. 21); however, not all of the poundage can be apportioned to the site 15-mile TDL which extends 7.31 to 15 miles into the Aransas Bay. Therefore, a conservative estimate of greater than one pound will be used.

#### 4.1.3.3.2.4 Calculation of Population Factor Value

The Population Factor Value has been assigned a value of 0.0000006 based on the Potential Contamination of the Corpus Christi Bay (Redfish Bay) and Aransas Bay fisheries (Ref.1, Table 4-18).

To calculate the Potential Human Food Chain Population Factor Value, the annual production of the potentially contaminated fishery values are multiplied by the dilution weight, summed and then divided by 10 (Ref. 1, Section 4.1.3.3.2.3).

Where:

Population Values (Pi) x Dilution Weight (Di) = Potentially Contaminated Fishery Values

Pi (0.03 + 0.03) x Di (.0001) = 0.000006

0.000006 x1/10 = 0.0000006

A Potential Human Food Chain Contamination Factor Value of 0.0000006 is assigned for Corpus Christi Bay and Aransas Bay fisheries.

**Potential Concentration Factor Value:** 0.0000006

#### 4.1.3.3.3 Calculation of Human Food Chain Threat-Targets Factor Category Value

The Human Food Chain Threat-Targets Factor Category is calculated by summing the Food Chain Individual (20) and Population Factor value for a watershed ( 0.0000006). The resulting value of 20.0000006 is assigned as the Human Food Chain Treat-Targets Factor Category Value (Ref. 1, Section 4.1.3.3.3).

#### 4.1.3.4 Calculation of Food Chain Threat Score

The Human Food Chain Threat Score is calculated by multiplying the Human Food Chain Threat Factor Category values for Likelihood of Release (550), Waste Characteristics (320), and Targets ( 20.0000006). The product of these values is then rounded to the nearest integer ( 3,520,000) and divided by 82,500. The resulting value, subject to a maximum of 100, is assigned as the Human Food Chain Threat Score for the watershed (Ref. 1, Section 4.1.3.4).

**Human Food Chain Threat Score: 42.67**

### 4.1.4 Environmental Threat

#### 4.1.4.1 Environmental Threat - Likelihood of Release

An observed release to the watershed has been documented by chemical analysis in section 4.1.2.1.1 Observed Release.

#### 4.1.4.2 Environmental Threat - Waste Characteristics

##### 4.1.4.2.1 Ecosystem Toxicity/Persistence/Bioaccumulation

The hazardous substances eligible to be evaluated for toxicity/persistence/bioaccumulation under the Environmental Threat - Waste Characteristics are those eligible to be evaluated for toxicity/persistence in the Drinking Water Threat for the watershed (Ref. 1, Section 4.1.4.2.1).

###### 4.1.4.2.1.1 Ecosystem Toxicity

The surface water ecosystem toxicity factor value for each hazardous substance is defined for both fresh water and salt water in the Superfund Chemical Data Matrix (SCDM), 1996 (Ref. 3). The factor value for each hazardous substance is evaluated under the salt water criteria and assigned in Table 37.

###### 4.1.4.2.1.2 Persistence

The surface water environmental persistence factor value for each hazardous substance of the predominant surface water category "River" was obtained from the SCDM, 1996 (Ref. 3). The factor value for each hazardous substance evaluated is assigned in Table 37.

###### 4.1.4.2.1.3 Ecosystem Bioaccumulation

The surface water environmental bioaccumulation potential factor value for each hazardous substance is defined for both fresh water and salt water in the SCDM, 1996 (Ref. 3). The bioaccumulation factor values for each hazardous substance is evaluated under the salt water criteria and assigned in Table 37.

Redfish Bay is designated as part of the Nueces Estuary. An estuary is defined as "a semi-enclosed coastal body of water having a free connection to the open sea and within which sea-water is measurably diluted with fresh water derived from land drainage" (Ref. 73, p. 32). Salt water will be used to evaluate this site (Ref. 2, p. 239).

**Table 37**
**Environmental Threat - Waste Characteristics**
**Ecosystem Toxicity/Persistence/Bioaccumulation Factor Values**

| Hazardous Substance | Source Number | Ecosystem Toxicity Factor Value | Persistence Factor Value | Bioaccum. Potential Factor Value | Tox/Per/Bio Factor Value | Reference |
|---|---|---|---|---|---|---|
| Fluoranthene | 2 | 1000 | 1.0 | 5000 | $5 \times 10^{6}$ | Ref. 1, 3 |
| Pyrene | 2, 5 | 10000 | 1.0 | 5000 | $5 \times 10^{7}$ | Ref. 1, 3 |
| Benzo(a)anthracene | 2 | 10000 | 1.0 | 50000 | $5 \times 10^{8}$ | Ref. 1, 3 |
| Chrysene | 1, 2, 3, 5 | 1000 | 1.0 | 500 | $5 \times 10^{5}$ | Ref. 1, 3 |
| Benzo(b)fluoranthene | 2 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Benzo(k)fluroanthene | 2 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Benzo(a)pyrene | 2 | 1000 | 1.0 | 500 | $5 \times 10^{5}$ | Ref. 1, 3 |
| Indeno(1,2,3-cd) pyrene | 2 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Benzo(g,h,i)perylene | 2 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Barium | 3 | 1 | 1.0 | 0.5 | $5 \times 10^{-1}$ | Ref. 1, 3 |
| Copper | 1, 3, 5 | 100 | 1.0 | 50000 | $5 \times 10^{6}$ | Ref. 1, 3 |
| Manganese | 1, 3, 5 | NA | 1.0 | 50000 | NA | Ref. 1, 3 |
| Mercury | 3 | 10000 | 0.4 | 50000 | $2 \times 10^{8}$ | Ref. 1, 3 |

Note: "River" was the predominant surface water body type used for factor value determination. Factor values for each hazardous substance were obtained from the Superfund Chemical Data Matrix (SCDM) 1996. Bioaccumulation factor (BCF) data are available in the Superfund Chemical Data Matrix (SCDM) 1996 for both fresh water and salt water for the hazardous substances evaluated at a site. Salt water BCF data were used in evaluating this site.

According to the Hazard Ranking System, Benzo(a)anthracene is the substance with the highest Ecosystem Toxicity/Persistence/Bioaccumulation Factor Value.

**Toxicity/Persistence/Bioaccumulation Factor Value: $5 \times 10^{8}$**

#### 4.1.4.2.2 Hazardous Waste Quantity

Below are the Hazardous Waste Quantity Values for Sources 1 through 5 as described in previous text.

**Table 38**
**Surface Water Pathway**
**Environmental Threat - Hazardous Waste Quantity**

| Source Number | Source Hazardous Waste Quantity Value (Sec. 2.4.2.1.5) | Is Source Hazardous Constituent Quantity data complete? (yes/no) |
|---|---|---|
| 1 | 1.47 | no |
| 2 | >0 | no |
| 3 | >0 | no |
| 4 | 102.70 | no |
| 5 | >0 | no |
| Sum of Values: | >0> | |

According to Section 2.4.2.2. of the HRS Rule, a hazardous waste quantity factor value of 100 was assigned because the hazardous constituent quantity data is not adequately determined for one or more sources, and targets for the Surface Water Migration Pathway are subject to Level II concentrations (Ref. 1, Section 2.4.2.2).

**Hazardous Waste Quantity Factor Value: 100**

#### 4.1.4.2.3 Waste Characteristics Factor Category Value

A Waste Characteristics Factor Category Value is based on the Waste Characteristics Product. The Waste Characteristics Product is the product of the Toxicity/Persistence Factor Value, the Hazardous Waste Quantity Factor Value and the Bioaccumulation Potential Factor Value.

(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential = Waste Characteristics Factor Category Value

Where:
Toxicity/Persistence Factor Value = 10,000
Hazardous Waste Quantity Factor Value = 100 (Default Value)
And:
Toxicity/Persistence x Hazardous Waste Quantity =
$10{,}000 \times 100 = 1 \times 10^{6}$

Where:
Toxicity/Persistence x Hazardous Waste Quantity = $1 \times 10^{6}$
Bioaccumulation Potential Factor Value = 50,000
And:
(Toxicity/Persistence x Hazardous Waste Quantity) x Bioaccumulation Potential =
$1 \times 10^{6} \times 50{,}000 = 5 \times 10^{10}$

A Waste Characteristics Product of $5 \times 10^{10}$ receives a Waste Characteristics Factor Category Value of 320 (Ref. 1, Table 2-7).

**Waste Characteristics Factor Category Value: 320**

### 4.1.4.3 Environmental Threat - Targets

#### 4.1.4.3.1 Sensitive Environments

##### 4.1.4.3.1.1 Level I Concentrations

No Level I contaminant concentrations can be documented for Surface Water Pathway since surface water samples or fish tissue samples were not collected. Only sediment samples were collected during the May 2000 ESI sampling activities at the Falcon Refinery site.

**Level I Concentration Factor Value: 0**

#### 4.1.4.3.1.2 Level II Concentrations

Wetlands Frontage

Sediment sample SE-14 (MF00NB) was collected at a location of 0.79 miles from PPE #1 in HRS qualifying wetlands as measured in Figure 8. This sediment sample documents Level II concentrations present in HRS-qualifying wetlands (Figure 4, Table 31).

According to the HRS, wetland frontage is estimated for coastal tidal waters by the length of the wetlands along the shoreline (Ref. 1, section 4.1.4.3.1.1) . There are approximately 1.32 miles of HRS-qualifying wetlands (E2EM1P - estuarine intertidal emergent persistent irregularly flooded, PEM1C - palustrine emergent persistent seasonally flooded, and PEM1Cx - palustrine emergent persistent seasonally flooded, excavated) along the hazardous substance migration, according to the National Wetlands Inventory Port Ingleside, Texas map, path from PPE #1 to the culvert that links the wetlands to Redfish Bay (Ref. 34, p.1; Ref. 53, p. 1). Additional HRS-qualifying wetlands extend out into Redfish Bay for greater than 3 miles.

The distances above were measured from the Digital Orthoquarter Quadrangle (DOQ) of the United States Geological Survey, Port Ingleside NW, Texas collected on and processed on January 7, 1995 (Figure 8; Ref. 76, p. 1). A DOQ is a digital image of a high-altitude aerial photograph in which the displacements caused by the camera angle and surface variations of the photographed terrain have been removed. This gives a DOQ the same geometric properties as a paper map; it is thus possible to use a DOQ for the direct measurement of distances, areas, angles, and positions (Ref. 77, p. 1).

The classifications for the sections of HRS-qualifying wetlands connected by culverts include (1) on-site area - palustrine unconsolidated bottom permanently flooded and (2) an area between Bishop Road and Sunray Road - estuarine intertidal unconsolidated shore regularly flooded (Ref. 55, p.1). This indicates that the flow through the culverts is perennial and the sections are in one watershed.

**Table 39**
**Surface Water Pathway**
**Wetlands Frontage**

| Type of Surface Water Body | Wetlands Frontage (Length) | Wetland Value for type of Surface Water Body | Reference |
|---|---|---|---|
| Redfish Bay (Coastal Tidal) | 1.32 miles | 50 | Figure 8, Ref. 53, sheet 1 |
| Total | | 50 | |

State or Federal Endangered or Threatened Species

The area in and around the refinery and the adjacent wetlands is known habitat for Federal and Stated designated endangered or threatened species (Ref. 78, p. 1). An inquiry through the TPWD Biological and Conservation Data System and a site visit from Mr. Beau Hardegree of the TPWD Lower Coast Conservation Assessment Program, indicated the following endangered and threatened species in the vicinity of the wetland areas adjacent to the site: Federal Listed Endangered and State Listed Endangered Species, Brown Pelican (*Pelecanus Occidentalis*) and the State Listed Threatened Species, Reddish Egret (*Egretta Rufescens*). In the Redfish Bay environment, the following endangered and threatened species include: Federal Listed Endangered Species, Brown Pelican (*Pelecanus Occidentalis*) and Kemp's ridley sea turtle (*Lepidochelys Kempii*), Federal Listed Threatened Species, Green Sea Turtle (*Chelonia mydas*), and the State Listed Endangered Species, Brown Pelican (*Pelecanus Occidentalis*) and State Listed Threatened Species, Reddish Egret (*Egretta Rufescens*) (Ref. 78, p. 1, 2, 4, 7, 8). This designation is considered a sensitive environment for HRS purposes (Ref. 1, Table 4-23).

The 15-mile in-water segment of the Surface Water Pathway extends into the Redfish Bay (designated also as Corpus Christi Bay), Corpus Christi Bay, and Aransas Bay. This bay system is designated as a National Estuary as part of the National Estuary Program and as the Corpus Christi Bay National Estuary Program (Ref. 54, pp. 21, 29). Designation as a National Estuary is considered a sensitive environment for HRS purposes (Ref. 1, Table 4-23).

**Table 40**
**Sensitive Environments**

| Type of Surface Water Body | Sensitive Environment | Sensitive Environment Value | Reference |
|---|---|---|---|
| On/Adjacent Wetlands and Redfish Bay | Federal Endangered and Threatened Species | 75 | Ref. 1, Table 4-23; Ref. 54, pp. 21, 29 |
| | State Endangered and Threatened Species | 50 | Ref. 1, Table 4-23; Ref. 54, pp. 21, 29 |
| Corpus Christi Bay - including Redfish Bay | Corpus Christi Bay National Estuary Program (CCBNEP) Study Area | 100 | Ref. 1, Table 4-23; Ref. 54, pp. 21, 29 |
| | Total | 225 | |

**Level II Concentration Factor Value: 275**

#### 4.1.4.3.1.3 Potential Contamination

Since Level II concentrations have been documented above, any value for potential wetland contamination would not significantly affect the site score. Therefore, potential contamination is not evaluated.

**Potential Contamination Factor Value (Not Evaluated): 0**

#### 4.1.4.3.1.4 Calculation of Environmental Threat-Targets Factor Category Value

The Environmental Threat-Target Factor Category Value for the watershed is the sum of the values for the Level I (0), Level II (275) and Potential Contamination (0) Factor Values. The resulting value of 275 is assigned as the Environmental Threat-Target Factor Category Value (Ref. 1, Section 4.1.4.3.1.4).

### 4.1.4.4 Calculation of Environmental Threat Score for a Watershed

The Environmental Threat Score is calculated by multiplying the Environmental Threat Factor Category Values for Likelihood of Release (550), Waste Characteristics (320) and Targets (275). The product of these values is then rounded to the nearest integer (48,400,000) and divided by 82,500. The resulting value (586.7), subject a maximum of 60, is assigned as the Environmental Threat Score for the watershed (Ref.1, Section 4.1.4.4).

### 4.1.5 Calculation of Overland/Flood Migration Component Score for a Watershed

The Overland/Flood Migration Component Score for the watershed is calculated by summing the scores for the Drinking Water Threat (0), Human Food Chain Threat ( 42.67) and Environmental Threat (60). The resulting score of 102.67, subject to a maximum value of 100, is assigned as the Surface Water Overland/Flood Migration Component Score for the watershed (Ref. 1, Section 4.1.5).

### 4.1.6 Calculation of Overland/Flood Migration Component Score

The highest surface water overland/flood migration component score from the watersheds evaluated (only one watershed was evaluated for this documentation record) is selected and assigned as the Surface Water Overland/Flood Migration Component Score for the site, subject to a maximum of 100. The Surface Water Overland/Flood Migration Component Score is assigned a value of 100 (Ref.1, Section 4.1.6).

**Environmental Threat-Target Factor Category Value: 275**

**Human Food Chain Threat Score:** 42.67

**Environmental Threat Score: 60**

**Surface Water Overland/Flood Migration Component Score: 100**

## 4.2 Ground Water to Surface Water Migration Component

The Ground Water to Surface Water Component was not evaluated because the Surface Water Pathway was maximized at 100 in evaluating the overland/flood component of the surface water pathway (Ref. 1, Section 4.2).

## 4.3 Calculation of Surface Water Migration Pathway Score

Only the Overland/Flood Migration Component (100) was scored. This value of 100 is assigned as the Surface Water Migration Pathway Score.

## 5.0 Soil Exposure Pathway

### 5.0.1 General Considerations

The Soil Exposure Pathway was not scored due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.

## 6.0 Air Migration Pathway

### 6.1.1 General Considerations

The air migration pathway was not evaluated due to the lack of targets and because the inclusion of this pathway would not significantly affect the site score.